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DISSOLVED PHASE INVESTIGATION SUMMARY REPORT
HARTFORD PETROLEUM RELEASE SITE
HARTFORD, ILLINOIS

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Project #: 24S-008-001

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1.0 INTRODUCTION

Apex Oil Company, Inc. (Apex) is performing groundwater investigation activities beneath the northern portions of the Village of Hartford, Illinois, also referred to as the Hartford Petroleum Release Site (Hartford Site). These investigation activities are being conducted pursuant to the July 28, 2008 Order (Docket Number 05-CV-242-DRH) issued by United States District Judge David Herndon and correspondence dated April 26, 2013 from the United States Environmental Protection Agency (USEPA) regarding "an initial assignment of work amongst the responsible parties" at the Hartford Site. The investigation activities have been completed in general accordance with the *Final Dissolved Phase Investigation Work Plan* (Trihydro 2013a) submitted to the USEPA on August 9, 2013.

1.1 SITE HISTORY

The Village of Hartford is located in Madison County, Illinois on the east bank of the Mississippi River, approximately twelve miles northeast of St. Louis, Missouri. Three refineries were constructed adjacent to the northern portion of the Village of Hartford between 1907 and 1941, the Amoco Oil Refinery (currently British Petroleum facility), the Clark Oil Refinery (currently the Premcor Facility), and the Shell Oil Refinery (currently the ConocoPhillips facility). In addition, a bulk petroleum storage facility was constructed north of the Village of Hartford (currently the Hartford Wood River Terminal Oil Company facility). Refining, storage, and transport of petroleum hydrocarbons continues to be conducted adjacent to the Village of Hartford associated with portions of these refineries and terminal operations. In addition, numerous underground and aboveground petroleum pipelines connect the refineries and terminal to loading and unloading facilities on the Mississippi River. Figure 1 shows the location of the Hartford Site and adjacent facilities. Numerous releases of petroleum hydrocarbons, hereafter referred to as light non-aqueous phase liquids (LNAPL), have been documented within or immediately adjacent to the northern portions of the Village of Hartford.

1.1.1 INTERIM MEASURES

Interim measures were implemented at the Hartford Site beginning in 1978, and have primarily consisted of LNAPL skimming and soil vapor extraction (SVE). As of 2015, approximately 3.25 million gallons of LNAPL had been recovered with 1.3 million gallons removed via skimming (USEPA 2010, RAM 2013) and an additional 1.9 million gallons as vapor from operation of the SVE system (Illinois EPA 2004, Trihydro 2015b). Figure 2 shows the volume of hydrocarbons recovered via skimming and SVE since 1978.

1.1.1.1 LNAPL RECOVERY

Between 1978 and 1979, Clark Oil Company installed two large diameter groundwater production wells (RW-001 and RW-002 shown on Figure 1) into the Main Sand stratum for the purpose of removing LNAPL. Between 1978 and

1990, skimming in the production wells recovered approximately 1,162,000 gallons of LNAPL with rates ranging from approximately 1,000 to 29,000 gallons per month (USEPA 2010). In 1993, Premcor installed an additional production well (RW-003 depicted on Figure 1) to the north of well RW-002. From January 1994 through September 2002, Premcor reportedly recovered an additional 82,700 gallons of LNAPL from the three production (USEPA 2010).

Beginning in 2004, the Hartford Working Group began managing interim measures and installed three additional wells (RW-004, RW-004A, and RW-005 depicted on Figure 1) for the purpose of LNAPL recovery. Approximately 18,000 gallons of LNAPL were recovered via skimming activities within the Main Sand stratum between 2004 and 2009. During this time, the Hartford Working Group also conducted several pilot tests to evaluate potential remedial technologies including multiphase extraction and dual phase extraction. An additional 12,000 gallons of LNAPL were recovered as part of pilot testing these two remedial technologies.

In March 2009, routine operations, maintenance, and monitoring (OMM) of the interim measures at the Hartford Site were transferred to Apex. Apex conducted LNAPL skimming at two of the recovery wells (RW-002 and RW-004A) through December 2010 and recovered 15,000 gallons of LNAPL. In addition, Apex conducted LNAPL skimming within groundwater monitoring wells throughout the groundwater and multipurpose monitoring network beginning in 2009 and recovered an additional 25,000 gallons of LNAPL through the end of 2012.

1.1.1.2 SOIL VAPOR EXTRACTION

An SVE system was installed and operated by Clark Oil & Refining Corporation (now Premcor) in 1992 and consisted of 12 vapor control boreholes, two blowers, and a single thermal treatment oxidizer. Beginning in 2005, the Hartford Working Group replaced the original SVE system in three phases. The current SVE system consists of a network of approximately 118 vapor extraction wells connected through a series of piping and valves to a single 12-inch pipe (referred to as the Main Header) that extends to the east beneath the railroad right-of-way to a series of four thermal oxidizers located on the Premcor Facility. Figure 3 shows the general location of the SVE extraction wells and piping, as well as the SVE Effectiveness Zones (Zones 1 through 6) established for the purpose of evaluating the system performance.

As shown on Figure 2, approximately 930,000 equivalent gallons of volatile petroleum hydrocarbons were recovered via the initial SVE system between 1992 and 2004. Approximately 1,000,000 equivalent gallons of volatile petroleum hydrocarbons have been recovered via the current SVE system between May 2005 and December 2015. Vapor recovery has not reached asymptotic conditions, as the highest daily recovery occurred in late 2012 due to sustained low water table conditions over several months.

1.1.2 PREVIOUS GROUNDWATER INVESTIGATIONS

In December 2003, Clayton Group Services, Inc. (Clayton) on behalf of the Hartford Working Group began monthly fluid level gauging, quarterly groundwater sample collection and laboratory analysis within five sentinel monitoring wells located between the limits of petroleum hydrocarbons beneath the northern portion of the Village of Hartford and the drinking water production wells located within the southern portions of the Village, as well as additional groundwater sample collection and analysis within 106 monitoring locations at the Hartford Site. The monitoring program was formalized in May 2005 with the approval the first *Dissolved Phase Groundwater Investigation Work Plan* (Clayton 2005a) by the USEPA. In addition, to modifying the routine monitoring program, this original work plan proposed: (1) collection and analysis of depth discrete groundwater samples via a direct push methodology, (2) collection of additional laser induced fluorescence (LIF) and cone penetrometer testing (CPT) data throughout the Hartford Site, and (3) in-situ hydraulic conductivity testing within select monitoring locations.

Collection of the depth discrete groundwater samples, installation of additional LIF and CPT borings, and completion of the in-situ hydraulic conductivity tests occurred between June and July 2005. The results of these investigation activities were submitted to the USEPA within the *Dissolved Phase Groundwater Investigation Report* (Clayton 2006a) in January 2006. In addition to summarizing the results of these investigation activities, the report proposed additional modifications to the dissolved phase monitoring program including: (1) installation of nested monitoring locations to the south of and within the LNAPL smear zone, (2) reduction of fluid level gauging from monthly to quarterly, (3) modification of the frequency and locations where groundwater samples were collected, and (4) analysis of groundwater samples for natural attenuation indicators from select locations. While, the installation of the additional monitoring locations did not occur following the submission of the report, fluid level gauging and groundwater sampling proceeded on a quarterly basis as outlined within the *Dissolved Phase Groundwater Investigation Report* (Clayton 2006a) beginning in October 2005. Between January 2006 and April 2007, quarterly reports summarizing the groundwater monitoring activities were submitted by Clayton to the USEPA and Illinois EPA.

In early 2007, groundwater monitoring activities were transferred from Clayton to URS Corporation (URS) by the Hartford Working Group. Subsequently in March 2009, URS on behalf of the Hartford Working Group submitted an updated *Dissolved Phase Investigation Work Plan* (URS 2009) in accordance with an Administrative Order of Consent (AOC) with the USEPA (Docket Number R7003-5-04-001). The work plan proposed: (1) installation of additional groundwater monitoring locations, (2) collection of additional LIF and CPT data, as well as (3) analysis of additional depth discrete groundwater samples during the installation of the LIF and CPT borings. Shortly after submitting the updated work plan, routine OMM of interim measures at the Hartford Site including assessment of dissolved phase conditions, were transferred to Apex and the investigation activities described in this updated work plan were not conducted.

In June 2009, the RAM Group of Gannett Fleming (Gannett Fleming) on behalf of Apex submitted the *Quarterly Groundwater Sampling and Gauging Sampling and Analysis Plan* (Gannett Fleming 2009a) to the USEPA. The sampling and analysis plan proposed a reduction in the frequency and number of locations for routine gauging and groundwater sampling, as well as suspending analysis of groundwater samples for natural attenuation indicators. These modifications to the groundwater monitoring program were approved by the USEPA in July 2009, with exception of proposed changes to the frequency of monitoring within the sentinel groundwater wells.

Subsequently on August 9, 2013, Trihydro Corporation on behalf of Apex, submitted the *Final Dissolved Phase Investigation Work Plan* (Trihydro 2013a) in accordance with Judge Herndon's 2008 Order. This final work plan incorporated comments and revisions from the USEPA and Illinois EPA regarding the proposed investigation activities. A summary of the results of the dissolved phase investigation and routine monitoring activities conducted in accordance with the *Final Dissolved Phase Investigation Work Plan* (Trihydro 2013a) between the third quarter of 2013 and third quarter of 2015 is provided herein.

1.2 PURPOSE

The primary objective of this most recent dissolved phase investigation is to provide data to support updates to the portions of the Conceptual Site Model (CSM) related to dissolved phase petroleum hydrocarbons beneath the Hartford Site. Specifically, the results of the investigation and routine monitoring activities performed since the third quarter of 2013 will address data gaps in the CSM including: (1) changes in the distribution of LNAPL and dissolved phase constituents within the various hydrostratigraphic units beneath the Hartford Site, (2) the rates of depletion of dissolved phase constituents of concern in response to interim remedial measures and natural smear zone depletion, and (3) natural attenuation processes acting to reduce petroleum hydrocarbon mass within the saturated zone. An updated CSM will be an important input for design of the final remedy for the Hartford Site. Additionally, the data collected as part of this dissolved phase investigation provides a baseline for comparison of future monitoring results, and may help in the development of final remedial goals that will be protective of both current and future receptors. The remainder of this report is organized into the following sections:

- Section 2.0 – Presents a summary of the current CSM for the Hartford Site including the nature, extent, fate, and transport of petroleum hydrocarbons in the subsurface.
- Section 3.0 – Presents a summary of the monitoring activities and the results of the dissolved phase investigation.
- Section 4.0 – Presents an interpretation of the monitoring results.
- Section 5.0 – Presents a summary of findings and recommendations for future monitoring activities.

2.0 SUMMARY OF CONCEPTUAL SITE MODEL

A CSM is a summary of the site-specific conditions affecting the distribution, mobility, and fate of chemicals in the environment and is used to assess and communicate the potential for human health risks. The CSM typically includes information about the geologic and hydrogeologic setting, contaminant sources, migration pathways, and potential receptors. This section provides a draft CSM for the Hartford Site. Portions of this draft CSM were previously summarized within the *LNAPL Component to the Conceptual Site Model* (Trihydro 2014). The findings presented in this report will be incorporated into the forthcoming dissolved phase component to the CSM for the Hartford Petroleum Release Site.

2.1 HYDROGEOLOGIC SETTING

The Hartford Site is located along the historical edges of the Mississippi and Missouri River flood plains within a shallow valley approximately 30 miles long and 11 miles across at its widest point, and underlain by more than 100 feet of unconsolidated deposits created by alluvial and glacial processes during the Pleistocene period. Over the last 125,000 years, the Mississippi River has changed its course frequently resulting in deposition of sediments with widely-varying grain size across a broad area creating a highly heterogeneous unconsolidated stratigraphy (USEPA 2010). As a result, the lithology beneath the Hartford Site consists of alternating alluvial deposits of clay and silt overlying a regionally extensive sand deposit referred to as the Main Sand stratum. The Main Sand stratum consists of alluvial sands and coarse grained glacial outwash that ranges from 80 to 100 feet in thickness. The alluvial deposits overlying the Main Sand, while interbedded and generally discontinuous, have been described by others in terms of a simplified stratigraphic sequence. The more permeable units have been identified (in descending order with respect to depth) as the North Olive, the Rand, and the EPA hydrostratigraphic units. These permeable zones are bounded by discontinuous clay deposits that have been labeled (in descending order with respect to depth) as the A, B, C, and D Clay.

The A Clay is continuously present beneath the Hartford Site, with the exception of areas where it has been removed as part of construction activities. The B and C Clay are highly discontinuous and of limited aerial extent. The B and C Clay define the extent of the North Olive and Rand hydrostratigraphic units, respectively. The North Olive and Rand strata laterally grade into and are hydraulically connected with the Main Sand (and Main Silt where present under the western and southwestern portions of the Hartford Site), where the B and C Clay are absent. Groundwater within the North Olive and Rand strata generally occurs as isolated areas of perched water on the surface of the underlying clay.

The D Clay underlies and defines the limits of the EPA stratum. The D Clay could be considered a discontinuous lens within the Main Sand stratum based on its relative thickness (thickness between approximately 2 to 7 feet) and limited extent (only present in the northeastern portion of the Hartford Site). The EPA stratum grades laterally into the Main Sand to the south of a southwesterly trending line extending from the intersection of Old St. Louis Road and North Delmar Avenue to just north of the intersection of East Date Street and North Olive Street. Along this boundary, the EPA and Main Sand strata are hydraulically connected with flow in the EPA stratum towards the southwest.

Groundwater present in the Main Sand stratum is part of an extensive aquifer system commonly referred to as the American Bottoms aquifer. Groundwater flow in the Main Sand stratum has been altered beneath the Hartford Site due to pumping on the BP (approximately 1,225 gallons per minute), Phillips66 (more than 6,000 gallons per minute along the river dock and 3,000 gallons per minute on the refinery), and Premcor (approximately 300 gallons per minute) facilities. The groundwater flow direction in the Main Sand is also influenced by the stage of the Mississippi River. During periods of high river stage, groundwater flow is generally towards the east to northeast due to recharge from the river and bank storage within the Main Sand. During moderate river elevations, the groundwater flow direction is northward. During low river stages, groundwater flow trends westerly to northwesterly.

The Mississippi River is located less than a half mile from the Hartford Site and is hydraulically connected to the two deeper hydrostratigraphic units (EPA and Main Sand), and on occasion during very high river stages, the groundwater surface in the Main Silt and Main Sand can reach the Rand stratum. Water level fluctuations in the EPA stratum and Main Sand correspond to changes in the Mississippi River stage. Since the river stage varies by more than 20 feet during a year, the groundwater conditions can fluctuate from unconfined to confined conditions.

2.2 NATURE AND EXTENT OF PETROLEUM HYDROCARBONS

Petroleum hydrocarbons were released from the former refineries, terminals, and related facilities located to the north and east of the Village of Hartford, as well as pipelines connecting these facilities with terminal operations on the Mississippi River. Released LNAPL migrated down through the subsurface under the influence of gravity until encountering the water table. Due to capillary forces, some fraction of the LNAPL was retained in soil pore space in the unsaturated zone, whereas some fraction of the LNAPL reached the capillary fringe where it displaced water present in soil pore space. As the volume of LNAPL became sufficient to overcome hydrostatic forces, further lateral and vertical migration occurred. The distribution of LNAPL stabilized as gravity and capillary forces approached equilibrium.

Vertical smearing of the LNAPL occurred over time as a result of fluctuation of the groundwater elevations within the hydrostratigraphic units beneath the Hartford Site, leaving some LNAPL within the soil pore spaces below and above the water table. The bottom of the "smear zone" is roughly coincident with the historical low groundwater elevation in the Main Sand. The thickness of the smear zone is variable measuring only a few inches at the plume periphery, to tens of feet in locations near historical releases. The vertical and lateral distribution of the smear zone also varies due to heterogeneities in the lithology. The LNAPL and dissolved phase plume boundaries are generally coincident at the up-gradient and lateral edges of the smear zone. Whereas, in the primary flow direction, a dissolved phase plume extends down-gradient from the LNAPL smear zone boundary.

The nature and extent of the LNAPL smear zone and dissolved phase petroleum hydrocarbons has been previously defined, at least in part, across the various water bearing units using LIF, soil core analyses, discrete depth groundwater sampling, and routine monitoring of the nested well network (Clayton 2004, 2005b, 2006a, 2006b). Based on these studies, the majority of the remaining LNAPL is present in the Main Sand stratum and consists of weathered gasoline, except in the northern and easternmost smear zone limits, which contain mixtures of gasoline and diesel (Clayton 2006b). LNAPL is also present to a lesser degree in the units above the Main Sand, including the North Olive, Rand, and EPA consisting primarily of diesel (Clayton 2006b).

LNAPL contains mixtures of individual constituents from many hydrocarbon families, including aliphatics, aromatics, paraffins, isoparaffins, olefins, and naphthenes. Each constituent has somewhat different physical, chemical, and toxicological properties. Some of these constituents are sufficiently toxic to pose a potential human health risk via dermal contact, ingestion, and inhalation if present at sufficient concentration. In the area adjacent to the distribution of LNAPL, some hydrocarbons dissolve in groundwater and migrate as solutes in the aqueous phase. Volatilization from LNAPL or dissolved phase hydrocarbons can produce vapors in the unsaturated zone immediately above the water table.

2.3 PETROLEUM HYDROCARBON RECOVERY

As described in Section 1.1.1, interim measures have been implemented since 1978 and have primarily consisted of LNAPL skimming and vapor extraction. Approximately 3.25 million gallons of LNAPL had been recovered with 1.3 million gallons removed via skimming (USEPA 2010, RAM 2013) and an additional 1.9 million gallons as vapor from operation of the SVE system (Illinois EPA 2004, Trihydro 2015b).

As shown on Figure 2, LNAPL recovery via skimming has substantially decreased over time as LNAPL saturations decreased due to interim remedial measures, as well as vertical smearing of LNAPL attributed to fluctuations of the

water table. The potential for LNAPL recoverability under confined conditions is minimal. During pilot testing in 2011 and 2012, there was a limited degree of drawdown that was induced within a small radius about the multiphase extraction wells under confining conditions, which limited mobilization and recovery of LNAPL and volatile hydrocarbons (WSP 2012). Furthermore, LNAPL recovery via skimming under unconfined conditions is also limited. Pilot testing during 2015 using a focused pumping approach (withdrawing groundwater at rates above 200 gallons per minute) for 60-days exposed between 25 and 40% of the LNAPL smear zone beneath Area A, during seasonally low groundwater elevations. However, during the 2015 pilot test, LNAPL was not recovered and LNAPL thicknesses were not measured above 0.1-feet within any of the monitoring locations installed within 75 feet of the groundwater production well. While LNAPL was initially present at a greater thickness within several of the monitoring locations situated between 75 and 250 feet of the production well, the thickness decreased over the duration of the pilot test such that LNAPL was only present in a single location (monitoring point MP-055C at 0.02-feet) on the final day of the pilot test when the water table was measured at the lowest elevation (Trihydro 2015f).

While LNAPL recovery via skimming may not be effective at reducing the overall mass remaining beneath the Hartford Site under confined and unconfined conditions, vapor recovery remains an effective means of recovering hydrocarbon mass. Recovery via vapor extraction has not reached asymptotic conditions, as the highest daily recovery occurred in late 2012 (Figure 2) during sustained low water table conditions that lasted several months.

In addition to the mass recovered via interim remedial measures, natural source zone depletion continuously acts to reduce the mobility, toxicity, and/or bioavailability of petroleum hydrocarbons beneath the Hartford Site over time. These processes tend to be more active on the margins of the smear zone and result in an outside-in weathering towards release areas within the smear zone. These intrinsic processes will become more dominant as additional mass is removed via engineered remedial efforts.

2.4 RECEPTORS

Receptors that have the potential to be affected by LNAPL and dissolved phase petroleum hydrocarbons primarily include residents and commercial workers in businesses located within the northern portions of the Village. As the groundwater beneath the Hartford Site, is not used for drinking water or secondary uses (e.g., irrigation, bathing, etc.) ingestion and dermal contact with dissolved phase petroleum hydrocarbons will not occur. The Village of Hartford's drinking water supply is located more than 600 feet to the southwest (up-gradient) of petroleum hydrocarbons present in soil and groundwater. The Village production wells are screened within deeper portions of the Main Sand stratum compared to the vertical limits of LNAPL and dissolved phase hydrocarbons beneath the Hartford Site. The two most recently installed groundwater production wells (No. 3 and No. 4) were installed by the Village of Hartford to a total

depth of approximately 105 feet below ground surface (ft-bgs) and were constructed with between 20 and 35 feet of screen. Administrative and engineering controls have been implemented to ensure protection of the drinking water supply in Hartford including cycling the pumping within the four drinking water production wells to reduce localized hydraulic gradients. In addition, groundwater monitoring of five sentinel wells located between the wellhead protection area and the southern extent of dissolved phase hydrocarbons is conducted quarterly. Since 2003, there have not been any petroleum hydrocarbons measured in groundwater samples collected from the sentinel wells above the Illinois EPA Tier 1, Class 1 standards, indicating that the Village drinking water wells remain protected.

With respect to vapor intrusion, the receptor would be any occupant of a building where vapors coming from the smear zone or dissolve phase plume enter that building at concentrations that pose a potential health risk. If soil vapors diffuse within the "zone of influence" of a structure without degrading, they will become available to be transported into the structure via advection and convection through drains, cracks, utility entrances, sumps, or other permeable discontinuities in the building floor or basement walls. Wind load on the side of a building, barometric pressure changes, HVAC system operation, or temperature differences can all contribute to building depressurization that can drive advection. Most of these processes are reversible, so gases generally flow into and out of buildings under varying conditions. Atmospheric air also enters buildings through doors, windows, and small openings, and the rate of air exchange in buildings typically reduces soil vapor concentrations by a factor of 100 to 10,000 (Johnson et al. 1999), depending on building design, construction, use, maintenance, soil conditions, weather conditions and other factors. Vapor intrusion events at the Hartford Site have been positively correlated with a rapid increase in the Mississippi River stage and advective movement of volatile petroleum related constituents associated with increasing groundwater elevations (Trihydro 2014). A river stage triggered event has previously been defined to occur when the elevation in the Mississippi River is equal to or greater than 410 ft-amsl (corresponds to a river stage of 14.5 feet) followed by an additional 2-foot rise over a 24-hour period.

3.0 INVESTIGATION ACTIVITIES

This section describes the field activities that were performed to address the data gaps in the CSM for dissolved phase hydrocarbons between September 1, 2013 and September 30, 2015. A description of the methods used for installation, monitoring, and analysis have been previously described within the *Final Dissolved Phase Investigation Work Plan* (Trihydro 2013a). Fluid level gauging, water quality sampling, and laboratory analyses were conducted in general accordance with the draft *Quality Assurance Project Plan* (QAPP) dated March 24, 2009 (Gannett Fleming 2009b).

3.1 LASER INDUCED FLUORESCENCE EVALUATION

A total of 24 LIF borings were installed in September 2013 across the Hartford Site using an Ultraviolet Optical Screening Tool (UVOST™). As shown on Figure 4, fourteen borings were installed at previous ROST™ monitoring locations within the six proposed remediation areas (Areas A, B1, B2, B3, B4, and C) described in the *LNAPL Active Recovery System 90% Design Report* (Clayton 2006b). These fourteen LIF borings were installed to assess changes in the LNAPL distribution within the hydrostratigraphic units targeted for remediation. To assess changes in the lateral and vertical distribution of LNAPL along the western and southern limits of the smear zone, ten additional borings were installed at previous LIF borings installed in 2004 and 2005 (including borings HROST-007, -013, -019, -028, -049, -066, -068, -072, -090, and -099). Each boring was installed to a minimum of five feet below the vertical smear zone limits in the Main Sand. It should be noted that a proposed LIF boring at location HROST-123 could not be completed in September 2013; multiple attempts to install an LIF boring at this location resulted in refusal at approximately 3 to 5 ft-bgs.

Both the ROST™ and UVOST™ make use of fluorescence and data acquisition systems developed wholly or in part by Dakota Technologies. These two methods differ primarily in the laser and associated wavelength used to excite polycyclic aromatic hydrocarbons (PAHs) within the LNAPL (290 and 308 nanometer wavelengths, respectively). The PAH mixtures within the LNAPL emit photons of a distinctive wavelength irrespective of the excitation wavelength, although the intensity of the response may vary. By sampling the total fluorescence at different wavelength channels (which are nearly identical for both tools), a multi-wavelength waveform is generated. The waveform allows simultaneous description of the spectral and temporal qualities of the fluorescence with depth and can be used to identify different product types. The waveform data are referenced and displayed as a percent of the response compared to the calibration reference emitter (RE). The RE is similar to a calibration gas used in a flame ionization or photoionization detector, and is placed on the sapphire probe window before collecting fluorescence data at each boring. The same RE is used for the ROST™ and UVOST™ (that is to say, the RE produces the same multi-wavelength waveform). Fluorescence measurements generated in the borings are normalized to the RE measurements

which allows for spatial and temporal comparisons of the fluorescence results despite changes in such variables as optics, laser energy drift, as well as window and mirror condition.

Both the ROST™ and UVOST™ readily detect most light- to mid-range product types including diesel and gasoline. The fluorescence responses for these product types are generally linear, with higher concentrations of PAHs within a given product type resulting in a greater percent response relative to the RE (excluding any matrix interferences described below). With respect to gasoline, ROST™ will potentially have an advantage over UVOST™ since its laser system produces a shorter wavelength. But much of this advantage may be normalized through comparison of the LIF results from ROST™ and UVOST™ to the same RE. This is generally observed in the waveforms for the ROST™ borings installed in 2004 and 2005 when compared to the UVOST™ borings installed at the Hartford Site in 2013. The fluorescence results from the 24 collocated borings are presented as mirror images on the figures included in Appendix A. The scale for the total waveform from the ROST™ was adjusted in the horizontal direction (i.e., stretched or compressed) so the percent fluorescence response (%RE) was equivalent to that of the corresponding scale for the UVOST™ waveform.

This comparison of the ROST™ and UVOST™ waveforms is semi-qualitative and may be affected by changes in the distribution or weathering of the LNAPL within the hydrostratigraphic units due to groundwater fluctuations, interim remedial system operation, and natural smear zone depletion. These results are semi-qualitative as there are several sources of variation with respect to fluorescence response beyond the aforementioned differences in the ROST™ and UVOST™. For instance, only the relative fraction of LNAPL that is optically accessible at the sapphire window of the probe can contribute to the fluorescence response. Therefore, significant heterogeneities in the lithologic setting and LNAPL distribution within the soil matrix can affect the fraction of LNAPL present within a few centimeters of the window. In addition, the method used to install the borings (e.g., cone penetrometer, direct push) can result in differing physical response of the soils and LNAPL such that the diameter of probe, push speed, and other factors combine to influence how much LNAPL gets preferentially drawn towards or pushed away from the sapphire window. Interpretations of the LIF results are set forth in Section 4.0.

3.2 FLUID LEVEL MONITORING

Pressure transducers were deployed in two transects across the Hartford Site as shown on Figure 5 to assess changes in groundwater elevations in response to seasonal variations in precipitation rates and the Mississippi River stage. Transducers were programmed to record groundwater elevations on an 8-hour interval.

Fluid level measurements were also manually gauged monthly within 51 groundwater monitoring wells and multipurpose monitoring points (Table 2) and quarterly within approximately 375 monitoring locations. The monthly fluid level measurements provide additional information regarding changes in LNAPL thickness over a range of water level conditions, as well as provide indications for when groundwater elevations are within the screen interval of a monitoring location to target groundwater sample collection. The quarterly fluid level measurements are used to generate water occurrence and potentiometric surface maps for the various hydrostratigraphic units beneath Hartford Site. The quarterly measurements generally reflect seasonal variability in groundwater elevations, gradients, and flow direction.

River stage measurements were also recorded daily (at 8:00 AM Central Time) from the National Oceanographic and Atmospheric Administration (NOAA) National Weather Service database for the Mel Price Lock and Dam located in Alton, Illinois. The groundwater elevation and LNAPL thickness measurements recorded via pressure transducers and manual gauging are provided in Appendix B. Appendix B also included the daily river stage measurements recorded between the third quarter 2013 and third quarter 2015.

3.3 DISSOLVED PHASE MONITORING

Groundwater samples were collected annually from the monitoring locations installed within each of the hydrostratigraphic units beneath the Hartford Site (North Olive, Rand, EPA, and Main Sand strata) in order to: (1) continue to demonstrate that dissolved phase petroleum-related constituents are stable along the southern and western limits of the smear zone, and (2) evaluate concentration trends in wells located across the smear zone. A summary of the monitoring locations where samples were collected and the analyses conducted is included in Table 2 and Figure 5.

The monitoring network identified in the *Final Dissolved Phase Investigation Work Plan* (Trihydro 2013a) included 20 groundwater monitoring wells and 33 multipurpose monitoring points. At the request of the USEPA, groundwater samples were also collected and analyzed annually from six additional monitoring locations since the third quarter of 2013. These locations were originally identified within the July 2, 2009 USEPA comments to the revised draft *Quarterly Ground Water Sampling and Gauging Plan* (Gannett Fleming 2009a). Furthermore, groundwater samples were collected monthly from eight monitoring locations during the additional LNAPL recovery pilot test conducted in Area A in 2014 and 2015, as outlined within the *Final Light Non-Aqueous Phase Liquid Recovery Pilot Test Work Plan Addendum* (Trihydro 2013b).

Finally, routine monitoring was performed quarterly within the sentinel monitoring network (wells HMW-25 through HMW-29). Routine monitoring of the sentinel well network was performed by the Hartford Working Group (HWG) between the third quarter 2013 and fourth quarter 2015. Groundwater monitoring in the sentinel network has been performed by Apex since the first quarter 2015. The analytical results for samples collected from the sentinel wells were incorporated into this evaluation of the overall dissolved phase monitoring program.

Samples were generally collected when the groundwater elevation was gauged to be within the screened interval of the groundwater monitoring well or multipurpose monitoring point, which was determined via monthly manual gauging measurements. Samples were not collected if LNAPL was measured within a well or if an LNAPL sheen was observed on the groundwater during purging activities. Groundwater samples were analyzed for the constituents of concern including benzene, ethylbenzene, toluene, total xylenes, and methyl tert-butyl ether (MTBE). Dissolved phase analytical results for the constituents of concern are provided in Table 3. Groundwater samples were also analyzed from select monitoring locations for total petroleum hydrocarbons and natural attenuation indicators including carbon dioxide, ferrous iron (Fe2+), dissolved and total manganese, methane, nitrate, nitrite, and sulfate. Analytical results for total petroleum hydrocarbons is summarized on Table 4 and the natural attenuation indicators are provided in Table 5.

Field forms for groundwater samples collected since the third quarter of 2015 are included in Appendix C. Laboratory analytical reports are provided in Appendix D. Data validation reports for each of the analytical packages provided by the laboratory are provided in Appendix E. Interpretations of the LIF, fluid level gauging, and dissolved phase analytical results are provided in Section 4.0.

4.0 INTERPRETATION

Data collected during the dissolved phase investigation and included herein will contribute to the development of the comprehensive CSM, as well as provide a baseline for future dissolved phase monitoring performed as part of a final remedy for the Hartford Site. The final remedy will be designed to confirm the stability of dissolved phase hydrocarbons and demonstrate protectiveness of potential receptors by:

1. Evaluating changes in the vertical and horizontal distribution of the LNAPL smear zone that is the source of dissolved phase petroleum hydrocarbons.
2. Confirming the stability of the dissolved phase plume beyond the smear zone limits.
3. Quantifying depletion rates within the smear zone due to engineered recovery and natural source zone depletion (NSZD).
4. Evaluating natural attenuation processes acting to deplete the source within the saturated zone.

The potential processes dictating plume stability at the Hartford Site can be inferred using qualitative and quantitative analyses of the groundwater data. Qualitative analyses consider spatial trends in petroleum hydrocarbons, while quantitative analyses include temporal trends of petroleum hydrocarbons in groundwater and depletion rate estimates. Several of the qualitative and quantitative interpretations are currently limited as the data contained herein represent baseline conditions. These data analyses will be bolstered over time as additional routine monitoring is conducted at the Hartford Site.

4.1 LNAPL DISTRIBUTION AND STABILITY

The fluorescence results from the 24 ROST™ borings installed in 2004 and 2005 compared to the results from the UVOST™ borings installed in 2013 are presented as mirror images on the figures included in Appendix A. In addition, a comparison of the vertical extent of LNAPL, as well as the depth and degree of maximum fluorescence response is included in Table 1. In general, the thickness of the smear zone was either similar (within 1-foot) or had decreased in all of the co-located borings between the time when the original ROST™ assessment was performed and when the UVOST™ investigation was completed. The only exception was an increase in the smear zone thickness observed in the shallow subsurface (at a very low fluorescence response) in boring HROST/HUVOST-005. Additionally, the maximum fluorescence response was generally unchanged or significantly lower within nearly all of the co-located borings with the exception of HROST/HUVOST-004. Temporal changes in the vertical extent of the LNAPL and maximum fluorescence response within a location between 2004 and 2013 may indicate preferential depletion of the smear zone due to a combination of interim measures, redistribution due to fluctuating groundwater elevations, and

natural smear zone depletion processes. The temporal changes were most prevalent within the shallow strata, as well as and within the deeper hydrostratigraphic units along the western and southern boundaries of the smear zone.

4.1.1 SMEAR ZONE DEPLETION IN THE SHALLOW STRATA

At those locations where LNAPL was identified in the North Olive strata via ROST™ in 2004 and 2005 (HUVOST/ HROST-002, -004, -007, -040, -049, -052, -090, and -113), there was a reduced response observed via UVOST™ in 2013. Additionally, there was no change (HUVOST/HROST -004, -005, -040, -052, and -130) or a reduced fluorescence response (HUVOST/HROST-002, -013, -029, -030, 049, -072, -090, and -113) observed in the Rand stratum. At one co-located boring, HROST-078/HUVOST-078 there was a slight increase in the fluorescence response observed within the North Olive and Rand strata. This boring is located within the interior portion of the LNAPL smear zone. Significant decreases in the fluorescence response in the Rand stratum were observed in locations situated along the margins, as well as the interior portions of the smear zone. Petroleum hydrocarbons within these shallowest hydrostratigraphic units are being targeted for recovery using SVE. Natural smear zone depletion is also occurring within the shallow strata via: (1) volatilization and subsequent biodegradation within the vadose and (2) nutrient delivery within rainwater infiltrate and subsequent oxidation by petrophilic bacteria in the saturated zone.

4.1.2 SMEAR ZONE DEPLETION IN THE MAIN SAND STRATUM

A comparison of the historical and more recent LIF results for borings installed along the western (HROST/HUVOST-013, -019, -028, -078, -090, and -099) and southern (HROST/HUVOST-049 and -072) edges of the smear zone provides evidence of depletion of the smear zone within the Main Sand stratum. Similar depletion of the smear zone was generally not observed within the co-located borings installed along the northern and eastern portions of the Hartford Site. There were not significant changes in the fluorescence response within borings installed in the interior portions of the smear zone, with the exception of co-located borings HROST/HUVOST-029, -030, -128, and -129. However, decreases in the fluorescence intensity at these locations was not coupled with significant decreases in the vertical thickness of the smear zone observed via LIF.

4.2 LNAPL OCCURRENCE AND THICKNESS

Beginning in 2009, Apex performed LNAPL skimming within the groundwater and multipurpose monitoring network across the Hartford Site. In general, LNAPL was removed from a monitoring location using a portable submersible pump (Clean Earth Technology Spill Buddy™) whenever the LNAPL thickness exceeded 0.5 feet. Per approval from the USEPA, LNAPL skimming was discontinued on September 30, 2013. Approximately 25,000 gallons of LNAPL was recovered over a four-year period, with the majority of that occurring within the first 12 months of skimming within a specific location.

Changes in the occurrence and thickness of LNAPL within the monitoring network can provide inferences regarding the distribution and saturation of LNAPL within the hydrostratigraphic units. This evaluation can be bolstered by comparing LNAPL thicknesses at similar elevations within a monitoring location over time. Now that skimming has been discontinued for more than two years at the Hartford Site, it is possible to evaluate such changes in LNAPL occurrence and thicknesses across the monitoring network. The evaluation of LNAPL occurrence and changes in thickness included herein is cursory and will be expanded in future reports including the forthcoming dissolved phase component to the CSM for the Hartford Petroleum Release Site.

4.2.1 NORTH OLIVE STRATUM

The North Olive stratum is defined by the presence of the underlying B Clay, such that the North Olive is absent if the underlying B Clay is absent. The North Olive stratum extends across the majority of the Hartford Site, with the most notable absence along North Delmar Avenue and North Market Street in the center of the Site (Figures 6 and 7). LNAPL and groundwater in the North Olive stratum generally occur in isolated areas that are temporarily perched on the surface of the underlying B Clay before draining into underlying stratum.

Quarterly fluid level gauging (Appendix B) includes manual measurements at 63 locations within the North Olive stratum. Groundwater elevations reported in these monitoring locations during high (Second Quarter 2014) and low (Fourth Quarter 2013) water table events are shown on Figures 6 and 7. More than 70% of monitoring locations in the North Olive stratum do not contain measurable groundwater year round, with more locations reported as dry under high water table conditions compared to low water table conditions. Groundwater elevations within a specific monitoring location can vary by less than a foot to more than three feet (e.g., HMW-048A) between high and low water table events. Precipitation is the dominant recharge mechanism influencing groundwater elevations in the North Olive stratum.

LNAPL has historically been measured within two groundwater monitoring wells (HMW-013 and HMW-044A) and two monitoring points (MP-055A and MP-108B) screened within the North Olive stratum, with the last occurrence (before skimming was discontinued), reported in monitoring point MP-108B in April 2011. LNAPL was only measured 22 times in these four locations prior to the commencement of skimming within the monitoring network and only under unconfined conditions (Trihydro 2014).

Table 6 presents a summary of the manual fluid level gauging results for wells screened in the North Olive stratum, where LNAPL was measured between the third quarter of 2013 and the third quarter of 2015. Over this two-year timeframe, LNAPL was only measured within two groundwater monitoring wells (HMW-044A and HMW-054A) and

one multipurpose monitoring points (MP-108B). LNAPL was only measured once within monitoring locations HMW-044A (0.20 feet) and HMW-054A (0.01 feet), and four times in monitoring point MP-108B (between 0.09 and 0.31 feet). The maximum LNAPL thickness was reported in multipurpose monitoring point MP-108B in May 2014 and thicknesses have been decreasing within this monitoring point since then.

4.2.2 RAND STRATUM

The Rand stratum is defined by the presence of the underlying C Clay, such that the Rand is absent if the underlying C Clay is absent. As shown Figure 8 and 9, the C Clay is highly discontinuous and only present in the northern and eastern portion of the Hartford Site, with the edge of this clay trending southeast from the west side of West Cherry Street to the east side of West Watkins Street. Similar to the North Olive stratum, the Rand is absent south of Watkins Street, although it generally covers a smaller footprint than the North Olive stratum.

Quarterly fluid level gauging (Appendix B) includes manual measurements at 49 locations screened in the Rand stratum. Figures 8 and 9 depict groundwater elevations within Rand stratum during high (Second Quarter 2014) and low (Fourth Quarter 2013) water table conditions. As with the North Olive stratum, groundwater in the Rand stratum is largely perched and is spatially, as well as temporally variable. Less than 25% of the monitoring locations in the Rand stratum remain dry year round, with a few additional locations reported as dry during low water table conditions compared to high water table conditions. Groundwater elevations within a monitoring location screened in the Rand Stratum can vary by less than a foot to more than 8 feet between high and low water table events. Significant differences in groundwater elevations over a year are most noteworthy within those monitoring locations situated in the northeast portion of the Hartford Site, as shown on the hydrograph for multipurpose monitoring point MP-029C (Appendix B). River stage in the Mississippi River does not appear to significantly affect groundwater elevations within the Rand stratum, except under extremely high river stage conditions. Precipitation appears to be the dominant recharge mechanism within the Rand, similar to the North Olive stratum.

LNAPL has been historically reported within 27 groundwater monitoring wells and multipurpose monitoring points screened in the Rand stratum between 2004 and 2009, prior to the initiation of routine skimming within the monitoring network. As shown in Table 7, LNAPL was reported in 14 monitoring locations screened in the Rand between the third quarter 2013 and third quarter 2015. LNAPL was historically reported in each of the locations identified in Table 7, with the exception of multipurpose monitoring point MP-044C. This well is located within the interior of the smear zone, and the occurrence of LNAPL may simply reflect redistribution of the mass and not a new release or migration of the LNAPL body.

As shown on the fluid elevation trends in Appendix F for those monitoring locations screened in the Rand stratum (HMW-048B, MP-029C, MP-046B, MP-051C, and MP-056B), the frequency of LNAPL occurrence is discontinuous over time. The thickness of LNAPL within a location is strongly correlated to whether LNAPL is confined or unconfined, as is most clearly depicted on the fluid elevation trend for MP-053C (Figure F-4). LNAPL thickness becomes exaggerated within monitoring point MP-053C, when the LNAPL elevation is above the overlying contact with the B-clay. During confining conditions (created when LNAPL within the stratum intercepts and is forced against overlying finer-grained clay), hydrostatic forces drive LNAPL into wells that behave essentially as pressure relief points. When this occurs the top elevation of the LNAPL in a monitoring well will be higher than the base of the confining unit since it is under hydrostatic pressure resulting in an exaggerated LNAPL thickness. When LNAPL is confined in a well, the initial mass present within the casing is recoverable; however, recovery of additional mobile LNAPL is minimal since much of the mass is trapped underneath the water table. Pilot testing of LNAPL recovery using multiphase and dual phase approaches under confining conditions was previously performed in Area A and resulted in the removal of minimal LNAPL and/or volatile hydrocarbons (WSP 2012). Between April and June 2015, approximately 14.75 inches of rainfall occurred in the Village of Hartford resulting in a rapid increase in groundwater elevations and confined LNAPL conditions observed within several of the monitoring locations screened in the Rand stratum including groundwater monitoring well HMW-044B, as well as multipurpose monitoring points MP-045B, MP-046B, MP-051C, and MP-055B.

Despite this apparent increase due to confining conditions in July 2015, it appears that LNAPL thicknesses are decreasing within the Rand stratum. Decreasing LNAPL thicknesses are expected since there have not been any new releases within the northern portions of the Village of Hartford and the mass of petroleum hydrocarbons has been and continues to be reduced via skimming, SVE, and intrinsic biodegradation.

4.2.3 EPA AND MAIN SAND STRATA

The EPA and Main Sand strata underlie the C-clay and are separated by the D-clay. The D Clay could be considered a thin lens within the Main Sand stratum and is only present in the northeastern most portion of the Village. This means that the EPA stratum is limited in aerial extent and that the Main Sand is present beneath most of the Hartford Site. There are currently four monitoring locations screened within the EPA stratum including monitoring wells HMW-003, HMW-048C, and HMW-049C, as well as multipurpose monitoring points MP-085C.

Figures 10 and 11 depict potentiometric surface maps for the Main Sand stratum based on quarterly fluid level measurements generated during high (Second Quarter 2014) and low (Fourth Quarter 2013) water table conditions. During low water table conditions (Fourth Quarter 2013), groundwater flow is generally to the north-northwest across

most of the Hartford Site with localized flow to the west within the northern portions of the Village. When the water table is seasonally high (Second Quarter 2014), groundwater flow within the Main Sand stratum is generally towards the north, with a divide approximately along North Delmar Avenue where flow is redirected to the northeast or the northwest.

As shown on the hydrographs generated using the pressure transducers deployed in select wells (Appendix B), groundwater elevations in the Main Sand stratum generally correlate with the Mississippi River Stage. Based on these hydrographs, it appears that the Mississippi River is the primary source for recharge within this aquifer.

There were 85 monitoring locations in the Main Sand stratum that were reported with LNAPL between the third quarter of 2013 and the third quarter of 2015. Historically, LNAPL has only been measured above 0.01-foot thickness in two monitoring locations (HMW-048 and MP-085C) screened within the EPA. LNAPL was not measured in either of these wells between the third quarter 2013 and third quarter 2015.

Groundwater and LNAPL present in the EPA and Main Sand can occur under confined or unconfined conditions depending on the fluid level elevation and occurrence of overlying less permeable strata including the D Clay to the northeast, the C Clay within the central and eastern portions of the smear zone, and sometimes the Main Silt[1] present in the western and southern portions of the Hartford Site.

Table 8 presents an analysis of wells and monitoring points reported with greater than 4-foot of LNAPL (29 locations) at any time since September of 2013, when LNAPL skimming was discontinued. This table also identifies the depth to the bottom of the overlying confining unit for comparison to the depth of the LNAPL. As shown in this table, LNAPL thicknesses within a monitoring location were typically less than two feet under unconfined conditions, and generally decreased as wells transitioned into high unconfined conditions (defined to occur when the depth to LNAPL was more than four feet below the bottom of the confining unit). LNAPL thicknesses increased significantly as conditions became confined, and were even more exaggerated when highly confined (defined to occur when the depth to LNAPL was more than four feet above the bottom of the confining unit). Highly unconfined conditions were observed in the first quarter 2014 and first quarter 2015, while highly confined conditions are observed during the third quarter 2015 following significant rainfall and rapid increase in the Mississippi River stage.

[1] The nature and distribution of groundwater and LNAPL within the Main Silt is combined with descriptions regarding the Main Sand herein. Although compositionally different from the Main Sand, the gradational contact between the Main Silt and Main Sand makes discerning the units difficult (Clayton 2005).

Historically and more recently, LNAPL has been measured within many of the groundwater monitoring wells and monitoring points screened in the Main Sand; which is why LNAPL skimming was historically focused within wells screened within this stratum. As shown on the fluid elevation trends in Appendix F for those monitoring locations screened in the Main Sand stratum (HMW-044C, HMW-054B, MP-029D, MP-039C, MP-047C, and MP-080C), LNAPL thicknesses are generally stable or have decreased since 2004 under both confined and unconfined conditions. While LNAPL thicknesses in some of the monitoring locations, such as well HMW-044C, have decreased substantially, in many wells the change in LNAPL thickness observed over the past decade is nominal, suggesting limitations in the effectiveness of mass recovery achieved via manual LNAPL skimming. Losses attributed to skimming performed within the groundwater monitoring wells and monitoring points since 2009 are localized to portions of the stratum immediately adjacent to the well screen. Charbeneau and Beckett (2007) suggest a radius of capture for LNAPL skimming between 10 and 30 feet. It is expected that the radius of capture for manual skimming would be on the low end of the suggested radius of capture as a result of the methodology used to recover LNAPL. Drawdown would be maximized immediately after skimming, and would decrease over time until the next skimming event (Trihydro 2014). Since drawdown was lower during recharge, this probably meant a lower radius of capture than would have been achieved with a dedicated skimmer (i.e., consistently maximized drawdown). Once skimming is discontinued, redistribution of LNAPL from areas of higher saturation to lower saturations (immediately around the monitoring well) would occur. This is generally observed in the hydrographs included in Appendix F for those locations screened in the Main Sand stratum.

The figures included in Appendix G show the maximum thickness of LNAPL measured within groundwater monitoring wells and multipurpose monitoring points screened within the Main Sand stratum over four time periods including 2003 through 2005 (Appendix G-1), 2007 through 2009 (Appendix G-2), 2011 through 2013 (Appendix G-3), and 2014 through 2016 (Appendix G-4). These figures present the maximum LNAPL thickness measured within the monitoring locations over each two-year span. LNAPL thicknesses were only considered when the LNAPL was present within the screen interval of the monitoring location (or in other words, when LNAPL was unconfined). In general, the lateral extent of monitoring locations where LNAPL has been measured at thicknesses less than one foot under unconfined conditions has generally been consistent beneath the majority of the Hartford Site, providing evidence that the smear zone is stable. The one exception is the northwest-most portion of the Hartford Site (SVE Effectiveness Zone 1), where LNAPL thicknesses appear to be increasing. LNAPL and soil samples collected during installation of the additional SVE wells in Zone 1 indicated an alternate source of petroleum hydrocarbons that was compositionally unique from other LNAPL samples collected at the Hartford Site (Trihydro 2015a).

4.3 DISSOLVED PHASE DISTRIBUTION AND PLUME STABILITY

Groundwater analytical results for the constituents of concern (including benzene, toluene, ethylbenzene, total xylenes, and MTBE) reported since the third quarter 2013 are used herein to demonstrate the stability of dissolved phase petroleum hydrocarbons along the western and southern portions of the smear zone. In addition, these data are used to evaluate the dissolved phase depletion rates in response to engineered remediation and natural attenuation processes within the saturated portions of the smear zone. The analytical for the dissolved phase constituents of concern are included in Table 3.

4.3.1 SHALLOW HYDROSTRATIGRAPHIC UNITS

Groundwater sampling and analysis for constituents of concern has been conducted within select monitoring locations screened in the shallow strata on an annual basis. Groundwater samples have been collected from four monitoring locations screened within the North Olive stratum (MP-048A, MP-056A, MP-085A, and MP-092C) and five monitoring locations screened within the Rand stratum (MP-034B, MP-042B, MP-056B, MP-083B, and MP-085B). Groundwater samples were also collected from multipurpose monitoring point MP-089A screened in the A-clay and monitoring well HMW-049B screened within the B/C clay. In many cases, attempts to collect groundwater samples within the shallow strata and clay lenses was not possible as there was not sufficient groundwater yield during sample collection. Figure 12 presents a summary of the dissolved phase constituents of concern for samples collected since the third quarter 2013 within the shallow strata and clay units.

Concentrations of dissolved phase constituents of concern in the North Olive stratum, overlying A clay, and underlying B/C clay are generally measured at very low concentrations or not detected above the laboratory reporting limits, with the exception of groundwater samples collected from well HMW-048A. This monitoring well is situated in the northeast-most portion of the Hartford Site on North Olive Street in SVE Effectiveness Zone 6. Vapor recovery in this area has been ineffective as many of the SVE wells are occluded (screen interval remains submerged beneath the water table) throughout the year (Trihydro 2015b). An evaluation of vapor recovery and potential optimization of the vapor collection system within SVE Effectiveness Zone 6 is currently being performed by Apex.

An analysis of dissolved phase benzene concentrations in samples collected from monitoring well HMW-048A over the past decade is included as Appendix H-1. Benzene was selected as it represents the constituent with the greatest potential risk to receptors when comparing the ratio of the constituent concentration measured in groundwater samples to risk based screening limits. Despite the limited effectiveness of vapor recovery within the northeast-most portion of the Hartford Site, dissolved benzene concentrations in samples collected from well HMW-048A (Appendix H-1) have

decreased by more than an order of magnitude since early 2005. It is expected that this decreasing concentration trend will continue and may increase as vapor recovery in SVE Effectiveness Zone 6 is optimized.

The concentration of the dissolved phase constituents are generally several orders of magnitude higher in the Rand stratum compared to the North Olive stratum and overlying clay lenses, with the exception of monitoring point MP-085B. The concentrations of dissolved phase constituents of concern in monitoring point MP-085B were reported below laboratory detection limits in the groundwater sample collected in 2014. Dissolved phase degradation trends for monitoring points MP-042B and MP-056B screened in the Rand stratum are presented in Appendix H-2 and H-3. These two monitoring points are the only locations in the Rand stratum with adequate data (sample results from at least three monitoring events where the water table was within the screen interval during sample collection) that could be used for a degradation analysis of benzene. Similar to well HMW-048A screened in the North Olive stratum, concentrations of dissolved phase benzene have decreased by nearly an order of magnitude within monitoring points MP-042B and MP-056B, suggesting that intrinsic biodegradation and vapor extraction have reduced the concentration of dissolved phase constituents within groundwater (and therefore the LNAPL source) since 2005.

4.3.2 DEEPER HYDROSTRATIGRAPHIC UNITS

As shown on Table 3, groundwater samples have been collected from 21 monitoring locations screened within the Main Sand, Main Silt, and EPA strata as outlined in the *Final Dissolved Phase Investigation Work Plan* (Trihydro 2013a). Routine groundwater samples were also collected from monitoring locations screened in these deeper hydrostratigraphic units as part of sentinel monitoring (Trihydro 2015c, 2015d, 2015e) and additional LNAPL recovery pilot testing in Area A (Trihydro 2015f). A summary of the analytical results for the dissolved phase constituents of concern measured in groundwater samples collected in the Main Sand, Main Silt, and EPA strata is provided on Figure 13. Data collected as part of sentinel monitoring and additional pilot testing are not depicted on Figure 13, but are included in Table 3. The inferred extent of dissolved phase benzene based on the monitoring conducted since the third quarter 2013 is included on Figure 13.

Concentrations of the dissolved phase constituents of concern are very low or not detected above the laboratory detection limits along the western and southern limits of the LNAPL smear zone. Concentrations increase significantly within the smear zone limits. As shown on Figure 13, there are very few locations within the interior portions of the smear zone where groundwater samples could be collected since the third quarter 2013. At many of the monitoring locations within the smear zone, LNAPL is present when the groundwater table is within the screened portion of the monitoring well (Appendix G-4). Additionally, at the time of preparing the *Final Dissolved Phase Investigation Work Plan* (Trihydro 2013a), it was recognized that intrinsic biodegradation processes would be more active on the margins

of the smear zone and result in an outside-in weathering towards release areas within the interior of the smear zone. Therefore, data collection efforts were focused on evaluation of the plume stability and natural smear zone depletion processes at the edges of the smear zone. It is expected that intrinsic processes will become more dominant as additional mass is removed via engineered remedial efforts. As shown on Table 3, data collected as part of the additional LNAPL recovery pilot testing (Trihydro 2015f) indicate that dissolved phase concentrations within the smear zone have remained elevated compared to concentrations at the margins of the smear zone, with dissolved benzene concentrations reported between 18.7 and 41.3 milligrams per liter (mg/L) beneath Area A.

Dissolved phase degradation trends have been prepared for six monitoring locations (HMW-038C, HMW-041B, HMW-042B, MP-063C, MP-078D, and MP-083C) screened within the Main Sand stratum. Each of these groundwater monitoring wells and multipurpose monitoring points are located on the western and southern edges of the smear zone. With the exception of well HMW-038C and monitoring point MP-083C, benzene concentrations have decreased significantly along the western and southern edges of the smear zone since 2005. Concentrations in monitoring point MP-083C are somewhat stable over time, while there is a slight increasing trend in well HMW-083C. It should be noted that there is significant variability in the data from these two locations with a coefficient of determination (R^2) less than 0.03 for the trend line through the dissolved phase analytical results. It is expected that locations screened within the interior of the smear zone in the Main Sand will have stable or increasing dissolved phase concentration trends until such time that additional remedial measures are implemented or outside-in natural depletion processes are acting to reduce the mass and composition of LNAPL within these portions of the smear zone.

Dissolved phase degradation trends have also been prepared for a single monitoring location screened within the EPA stratum (HMW-049C). Dissolved phase benzene concentrations have steadily decreased within monitoring well HMW-049C over time, with a dramatic decrease in the concentration observed in 2015. It should be noted that as groundwater monitoring continues, trend analyses may be prepared for a number of additional monitoring locations. Dissolved phase constituent trends may also be considered for groups of wells within different portions of the smear zone and hydrostratigraphic units to assess the efficacy of remedial efforts and natural smear zone depletion processes over time.

4.4 GEOCHEMICAL INDICATORS OF NATURAL ATTENUATION

Characterization of geochemical indicators in the shallow and deeper hydrostratigraphic units provides evidence of natural processes that may be attenuating petroleum hydrocarbons in the smear zone. While measuring biodegradation directly is challenging, it is possible to measure changes in geochemical parameters that can be related qualitatively and

quantitatively to natural attenuation process. Geochemical species serve as electron acceptors and are reduced during microbial degradation (i.e., oxidation) of petroleum hydrocarbons.

The primary mechanism for natural attenuation is through the metabolic processes of petrophilic microorganisms that are ubiquitous in the subsurface. Within the saturated zone, aerobic biodegradation of petroleum hydrocarbons will proceed until dissolved oxygen is depleted and anaerobic conditions prevail. Typically, there are numerous potential electron acceptors besides oxygen that are available to support microbial respiration. Microorganisms preferentially use the electron acceptor that is thermodynamically most favorable, as follows:

- Denitrification (reduction of nitrate), with the eventual production of molecular nitrogen
- Reduction of manganese from Mn4+ to Mn2+
- Reduction of ferric iron (Fe3+) to ferrous iron (Fe2+)
- Sulfate reduction, with eventual production of sulfide
- Methanogenesis (use of the hydrocarbon as the electron acceptor, via fermentation reaction), with the production of methane

Where significant hydrocarbon mass exists, methanogenesis can become the dominant long-term degradation pathway as more thermodynamically favored electron acceptors become depleted within the saturated zone. The primary by-products of aerobic and anaerobic biodegradation are carbon dioxide and methane. These gases can be transferred from the saturated zone to the vadose zone by partitioning into soil gas, as well as formation of gas bubbles and ebullition. A summary of the hydrogeochemical indicator concentrations measured in groundwater samples collected from the Rand and Main Sand strata is provided on Table 6. Monitoring was focused on these two hydrostratigraphic units as they are aerially extensive (compared to the EPA and Main Silt stratum) and contain mobile and residual LNAPL (compared to the North Olive stratum).

4.4.1 RAND STRATUM

Groundwater from two monitoring locations within the Rand stratum (MP-034B and MP-042B) were sampled in 2014 for geochemical indicators of natural attenuation. A summary of select geochemical indicators measured in these two monitoring locations is presented on Figure 12. Both of these monitoring locations are situated in the interior portions of the smear zone and it is not possible to compare the geochemical indicator concentrations to locations outside the smear zone limits. However, it is possible to infer microbial degradation processes in these two locations through comparison to geochemical indicator concentrations measured in monitoring locations outside of the smear zone and screened in the Main Sand stratum (monitoring points MP-063C and MP-065C as shown on Figure 14), as well as

historical measurements from a background location (well HMW-050A) situated outside of the smear zone and screened in the Rand stratum. As shown on Figure 12, concentrations of electron acceptors including sulfate (reported between 6.0 and 12 mg/L) and nitrate (reported as non-detect above the laboratory reporting limit) in groundwater samples from monitoring points MP-034B and MP-042B are significantly reduced when compared to locations outside of the smear zone in the Main Sand (sulfate between 36 and 150 mg/L and nitrate between 0.75 and 14 mg/L), as well as historical concentrations measured in groundwater samples collected from monitoring well HMW-050A in April 2009 (sulfate concentration of 221 mg/L and nitrate of 4.52 mg/L). In addition, concentrations of geochemical byproducts of microbial degradation of petroleum hydrocarbons including ferrous iron, dissolved manganese, and dissolved methane are elevated within groundwater samples collected in 2014 from the Rand stratum compared to the monitoring locations situated outside of the smear zone in the Main Sand stratum.

4.4.2 MAIN SAND STRATUM

Geochemical indicators of natural attenuation were assessed within groundwater samples collected from eight monitoring locations screened in the Main Sand stratum between 2013 and 2015. The spatial distribution of electron acceptors and byproducts are displayed on Figure 14. There are two locations (monitoring points MP-063C and MP-065C) situated up-gradient of the limits of the smear zone and two other locations that are located on the margins of the smear zone (monitoring wells HMW-040C and HMW-042B). Concentrations of nitrate and sulfate are significantly reduced within the smear zone and are indicative of denitrification and sulfate reduction of petroleum hydrocarbons in the Main Sand stratum. Concentrations of geochemical byproducts including dissolved iron, manganese, and methane are significantly elevated within the smear zone compared to the up-gradient locations, which indicate iron and manganese reduction, as well as methanogenesis. It is expected that natural attenuation processes will continue to reduce the mass and composition of LNAPL within the smear zone over time. It may be possible to quantify natural smear zone depletion rates and evaluate the efficacy of intrinsic biodegradation processes as part of developing a multiphase remedy for the Hartford Site.

5.0 SUMMARY

This section summarizes the key findings from the dissolved phase investigation and provides recommendations for future groundwater monitoring activities at the Hartford Petroleum Release Site.

5.1 LNAPL

Comparison of the LIF data collected between 2004 and 2005 via ROST to more recent data collected via UVOST in 2013 indicate that LNAPL has been preferentially depleted within the shallow hydrostratigraphic units, as well as the southern and western margins of the smear zone in the deeper hydrostratigraphic units. Petroleum hydrocarbons within the shallow hydrostratigraphic units are being targeted for recovery using SVE. Natural smear zone depletion is also occurring within the shallow and deeper strata via: (1) volatilization and subsequent biodegradation within the vadose zone, (2) nutrient delivery within rainwater infiltrate and subsequent oxidation by petrophilic bacteria within perched zones, as well as (3) influx of electron acceptors within groundwater from areas up-gradient of the smear zone resulting in the observed outside-in depletion via microbial biodegradation in the saturated zone.

Routine fluid level gauging performed since skimming activities were discontinued in the third quarter 2013, indicate that LNAPL thicknesses under confined and unconfined conditions are generally stable or decreasing within the North Olive, Rand, and EPA strata. Whereas LNAPL thicknesses observed within the Main Sand stratum are generally similar to those observed over the past decade, suggesting that manual skimming between 2010 and 2013 did not affect LNAPL saturations within the smear zone. The extent of monitoring locations where LNAPL has been measured at thicknesses less than one foot under unconfined conditions in the Main Sand has not changed significantly since 2003, providing further evidence that the smear zone is stable. The one exception is the northwest-most portion of the Hartford Site (SVE Effectiveness Zone 1), where LNAPL thicknesses appear to be increasing. LNAPL and soil samples collected during installation of additional SVE wells in Zone 1 in early 2015 indicated an alternate source of petroleum hydrocarbons that was compositionally unique from other LNAPL samples collected across the remainder of the Hartford Site (Trihydro 2015a).

5.2 DISSOLVED PHASE PETROLEUM HYDROCARBONS

Concentrations of dissolved phase constituents of concern in samples collected from the North Olive stratum were generally very low or not detected above the laboratory detection limits since the third quarter 2013, which is consistent with the significant decreases in the LIF response observed within this stratum. While dissolved phase constituents of concern were generally measured at higher concentrations in the Rand stratum compared to the North Olive, significant decreasing trends were observed in benzene concentrations over the past decade.

Decreasing trends of dissolved phase constituents of concern were also observed within the EPA stratum, as well as the western and southern edges of the smear zone in the Main Sand stratum. However, dissolved phase constituent concentrations remain elevated within the interior portions of the smear zone within the Main Sand.

The concentration of electron acceptors including nitrate and sulfate are significantly reduced, while the concentration of geochemical byproducts including dissolved iron, manganese, and methane are significantly elevated in groundwater samples collected from within the smear zone in the Rand and Main Sand strata compared to up-gradient locations. Changes in these geochemical indicators within the Rand and Main Sand strata provide qualitative evidence of intrinsic biodegradation of petroleum hydrocarbons within the saturated zone. It is expected that locations screened within the interior of the smear zone in the Main Sand will remain elevated until such time that additional remedial measures are implemented or outside-in natural depletion processes are able to reduce the mass and composition of LNAPL within these portions of the smear zone.

5.3 RECOMMENDATIONS

Of the 48 monitoring locations identified in the *Final Dissolved Phase Investigation Work Plan* (Trihydro 2013a) and the *Quarterly Ground Water Sampling and Gauging Plan* (RAM 2009), groundwater samples were collected at least once from 32 multipurpose monitoring points or groundwater monitoring wells between September 2013 and September 2015. Groundwater samples could not be collected from the remaining 16 locations as a result of: (1) insufficient groundwater yield, (2) LNAPL within the well or monitoring point, or (3) groundwater not present within the screened interval over the course of the entire year. Based on the past two years of monitoring, the following modifications to the routine dissolved phase monitoring program are recommended:

- Discontinue monthly fluid level gauging in lieu of the quarterly fluid level gauging
- Discontinue groundwater monitoring activities within six monitoring locations
- Commence groundwater monitoring activities within three additional locations

The primary function of monthly fluid level gauging has been to determine if groundwater is present within the screen interval of a monitoring location to allow collection of groundwater samples. However, a comparison of the monthly fluid level gauging to the quarterly gauging results indicates that if groundwater sampling was conducted based solely on the quarterly fluid level measurements, only two monitoring locations would not have been sampled over the past two years (HMW-041C and MP-056B). Therefore, Apex requests discontinuance of routine monthly gauging activities beginning in the second quarter 2016.

Apex recommends discontinuing routine monitoring within the following six locations: HMW-048D, HMW-049A, HMW-049D, MP-085D, MP-132S, and MP-132M. The rationale for discontinuing monitoring activities at these locations includes:

- Well HMW-049A has a screen interval that does not allow for the groundwater sampling criteria to be met and for adequate groundwater volume to be present to allow for collection of a sample for laboratory analysis. The screen interval for well HMW-049A is 1.7 feet long.
- Monitoring wells HMW-048D and HMW-049D, and multipurpose monitoring point MP-085D have screen intervals that are set deeper than any fluid level measured at any time over the past two years. These monitoring wells have never met the sampling criteria described in the *Final Dissolved Phase Investigation Work Plan* (Trihydro 2013a).
- Multipurpose monitoring points MP-132S and MP-132M have a 0.5-inch casing diameter and screen interval of less than 1-foot in length, which does not allow for groundwater samples to be collected at these locations.

Apex also recommends initiating groundwater monitoring activities within the following three locations: HMW-051C, MP-062C, and MP-088C. The rationale for adding these three locations includes:

- Monitoring well HMW-051C is located along the southwestern margin of the inferred extent of dissolved phase constituents of concern. Groundwater samples have not been collected at this monitoring location since 2005. Groundwater monitoring within well HMW-051C would confirm the stability of dissolved phase hydrocarbons and also provide indicators of natural attenuation along the southwestern limits of the smear zone.
- Monitoring point MP-062C is located along the southern limits of the inferred extent of the dissolved phase hydrocarbons. Groundwater samples have not been collected at this monitoring location since 2005. Groundwater monitoring within monitoring point MP-062C would confirm the stability of dissolved phase hydrocarbons and also provide indicators of natural attenuation along the southern limits of the smear zone.
- Monitoring point MP-088C is also located along the southern limits of the inferred extent of the dissolved phase hydrocarbons. Groundwater samples have only been collected twice from this location (2005 and 2012), and included analysis for petroleum related constituents. Comparison of the dissolved phase results from the 2005 and 2012 monitoring events suggest a decrease in benzene concentrations along this portion of the smear zone.

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TABLE 1. COMPARISON OF LASER INDUCED FLUORESCENCE RESULTS
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Laser Induced Fluorescence Boring ID	2004 and 2005 Laser Induced Fluorescence Results			2013 Laser Induced Fluorescence Results			Change in Smear Zone Thickness
	Vertical Extent of LIF Response	Maximum LIF Response	Depth of Maximum LIF Response	Vertical Extent of LIF Response	Maximum LIF Response	Depth of Maximum LIF Response	
	(ft-bgs)	(%)	(ft-bgs)	(ft-bgs)	(%)	(ft-bgs)	(feet)
HROST/HUVOST-002	31-42	135.9	35.6	31-43	134.6	32.4	1.0
HROST/HUVOST-004	6-53	120.8	33.6	8-49.5	222.1	34.2	-5.5
HROST/HUVOST-005	20-46	242.1	39.7	13.5-48.5	144.8	42.0	9.0
HROST/HUVOST-007	30-40	11.6	39.3	32-41	13.3	36.4	-1.0
HROST/HUVOST-013	16-39	58.8	32.9	33-35	21.8	35.0	-21.0
HROST/HUVOST-019	28-36	43.2	32.2	31-34	4.1	0.8	-5.0
HROST/HUVOST-025	26.5-40.5	39.9	32.8	28-41	75.4	29.0	-1.0
HROST/HUVOST-028	25-37	50.7	32.5	24-36	6.8	28.7	0.0
HROST/HUVOST-029	15-43	197.5	29.7	19-43	46.4	29.8	-4.0
HROST/HUVOST-030	17-43	123.6	40.7	21.5-42.5	38.3	40.4	-5.0
HROST/HUVOST-039	19.5-44.5	121.6	47.7	19-43.5	68.5	42.1	-0.5
HROST/HUVOST-040	7-46	202.6	31.9	18.5-43	242.0	21.0	-14.5
HROST/HUVOST-049	6-40	147.4	7.3	29-40	6.1	38.9	-23.0
HROST/HUVOST-052	13-39	52.4	35.4	23.5-39	27.7	34.0	-10.5
HROST/HUVOST-066	35-36.5	9.1	35.6	35.5-37.5	6.1	36.7	0.5
HROST/HUVOST-068	29-39	15.8	33.3	29-39.5	15.3	39.0	0.5
HROST/HUVOST-072	25.5-32	9.3	26.1	–	2.6	2.2	-6.5
HROST/HUVOST-078	17-52	50.9	40.7	19-45	44.9	31.3	-9.0
HROST/HUVOST-090	12-47	348.9	38.8	21-42	188.5	40.0	-14.0
HROST/HUVOST-099	30-59	31.6	31.7	32-33	3.3	32.4	-28.0
HROST/HUVOST-113	9-73	714.9	29.7	18-42.5	323.6	27.3	-39.5
HROST/HUVOST-128	32-47	445.6	38.6	34-41	38.9	35.7	-8.0
HROST/HUVOST-129	33-47	775.8	34.3	34.5-41.5	27.6	35.4	-7.0
HROST/HUVOST-130	16-50	300.9	40.8	17.5-45.5	193.5	20.1	-6.0

Notes:

ft-bgs - feet below ground surface

TABLE 2. GROUNDWATER MONITORING NETWORK AND ACTIVITIES
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Monthly Gauging	Pressure Transducer	BTEX	Geochemical Indicators
MP-081A[1]	A Clay	X	–	X	–
MP-089A[1]	A Clay	X	–	X	–
HMW-038A	North Olive	X	–	–	–
HMW-048A	North Olive	X	–	X	–
HMW-049A	North Olive	X	–	X	X
MP-034A	North Olive	X	–	X	X
MP-042A	North Olive	X	–	X	X
MP-056A	North Olive	X	–	X	X
MP-078B	North Olive	X	–	–	–
MP-083A	North Olive	X	–	X	X
MP-085A	North Olive	X	–	X	–
MP-132S	North Olive	X	–	X	–
HMW-048B	Rand	X	–	X	X
HMW-049B[1]	Rand	X	–	X	–
MP-029C	Rand	X	X	–	–
MP-034B	Rand	X	–	X	X
MP-042B	Rand	X	–	X	X
MP-049B	Rand	X	–	X	X
MP-056B	Rand	X	–	X	–
MP-078C	Rand	X	–	–	–
MP-083B	Rand	X	–	X	X
MP-085B	Rand	X	–	X	–
MP-132M	Rand	X	–	X	X
HMW-048C	EPA	X	–	X	–
HMW-049C	EPA	X	–	X	–
MP-085C	EPA	X	–	X	–
HMW-038C	Main Sand	X	–	X	–
HMW-039A	Main Sand	X	–	X	–
HMW-039B	Main Sand	X	–	X	–
HMW-039C	Main Sand	X	X	X	X
HMW-040B	Main Sand	X	–	X	–
HMW-040C	Main Sand	X	–	X	X
HMW-041A	Main Sand	X	–	X	–
HMW-041B	Main Sand	X	–	X	X
HMW-041C	Main Sand	X	–	X	–
HMW-042B	Main Sand	X	–	X	X
HMW-048D	Main Sand	X	–	X	X
HMW-049D	Main Sand	X	–	X	–
HMW-052B	Main Sand	X	–	X	–
HMW-052C	Main Sand	X	–	X	–

TABLE 2. GROUNDWATER MONITORING NETWORK AND ACTIVITIES HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Monthly Gauging	Pressure Transducer	BTEX	Geochemical Indicators
MP-034C	Main Sand	X	–	X	X
MP-042C	Main Sand	X	–	X	–
MP-049C	Main Sand	X	–	X	–
MP-053C	Main Sand	X	X	–	–
MP-055C	Main Sand	X	X	–	–
MP-056C	Main Sand	X	–	X	–
MP-063C	Main Sand	X	–	X	X
MP-065C	Main Sand	X	–	X	X
MP-078D	Main Sand	X	–	X	X
MP-079D	Main Sand	X	X	–	–
MP-080C	Main Sand	X	X	–	–
MP-081B[1]	Main Sand	X	–	X	–
MP-081C[1]	Main Sand	X	–	X	–
MP-083C	Main Sand	X	–	X	X
MP-085D	Main Sand	X	X	X	X
MP-092C	Main Sand	X	–	X	–
MP-084C	Multiple Strata	X	X	–	–
MP-090C	Multiple Strata	X	X	–	–
MP-092D	Multiple Strata	X	X	–	–

Notes:

X - indicates activity was performed

– - indicates activity was not performed

[1] - Monitoring location identified in the July 2, 2009 USEPA comments to the revised draft *Quarterly Ground Water Sampling and Gauging Plan* submitted by the RAM Group of Gannett Fleming

TABLE 3. DISSOLVED PHASE CONSTITUENTS OF CONCERN ANALYTICAL RESULTS SUMMARY
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Location	Hydrostratigraphic Unit	Date	Benzene (mg/L)	Ethylbenzene (mg/L)	Toluene (mg/L)	Xylenes, Total (mg/L)	MTBE (mg/L)	Arsenic (mg/L)	Lead (mg/L)
HMW-025[1]	Main Sand	1/29/15	0.0028	0.0016	ND(0.0010)	0.0054 J	ND(0.0020)	--	--
Duplicate		1/29/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	0.0023 J	ND(0.0020)	--	--
		5/27/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
		9/22/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
HMW-026[1]	Main Sand	1/29/15	ND(0.0020)	0.0010 J	ND(0.0010)	0.0026 J	ND(0.0020)	--	--
		5/27/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
Duplicate		5/27/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
		9/22/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
HMW-027[1]	Main Sand	1/29/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	0.0023 J	ND(0.0020)	--	--
		5/27/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
		9/22/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
Duplicate		9/22/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
HMW-028[1]	Main Sand	1/29/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	0.0018 J	ND(0.0020)	--	--
		5/28/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
		9/22/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
HMW-029[1]	Main Sand	1/29/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	0.0014 J	ND(0.0020)	--	--
		5/28/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
		9/22/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	--	--
HMW-038C	Main Sand	11/21/13	2.4	0.35	0.041	1.5	ND(0.040)	0.07	0.014
		1/30/15	1.8	0.34	ND(0.25)	0.75	ND(0.10)	--	--
HMW-039A	Main Sand	7/23/15	0.0032	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0020)	--	--

TABLE 3. DISSOLVED PHASE CONSTITUENTS OF CONCERN ANALYTICAL RESULTS SUMMARY
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Location	Hydrostratigraphic Unit	Date	Benzene (mg/L)	Ethylbenzene (mg/L)	Toluene (mg/L)	Xylenes, Total (mg/L)	MTBE (mg/L)	Arsenic (mg/L)	Lead (mg/L)
HMW-039B	Main Sand	1/30/15	ND(0.0020)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0020)	--	--
		9/23/15	ND(0.0020)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0020)	0.0010	ND(0.0010)
HMW-039C	Main Sand	2/20/14	0.0044 J	0.042 J	ND(0.0050)	0.12 J	--	ND(0.0030) UJ	ND(0.0069)
HMW-040B	Main Sand	7/1/14	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0020)	ND(0.0010)	ND(0.0069)
		8/31/15	ND(0.0020) UJ	ND(0.0010) UJ	ND(0.0010) UJ	ND(0.0010) UJ	ND(0.0020) UJ	--	--
HMW-040C	Main Sand	11/20/13	0.017 J	0.015	0.025	0.071	ND(0.0020)	ND(0.013)	ND(0.0080)
		1/30/15	ND(0.0020)	ND(0.0020)	ND(0.0020)	ND(0.0050)	ND(0.0020)	0.0015	ND(0.0010)
		9/23/15	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0050)	ND(0.0020)	0.00080 J	ND(0.0010)
HMW-041B	Main Sand	11/19/13	15 J	2.6	16 J	13	ND(0.040)	ND(0.013)	ND(0.0080)
		7/7/14	0.63	ND(0.050)	ND(0.050)	ND(0.050)	--	ND(0.0010)	ND(0.040)
		8/30/15	0.15	0.0020 J	0.0042 J	0.0051	--	0.0014	ND(0.0069)
HMW-041C	Main Sand	11/20/13	0.0058 J	0.0059 J	0.015 J	0.029	ND(0.0020)	ND(0.0030)	ND(0.0069)
Duplicate		11/20/13	0.013 J	0.0074 J	0.021 J	0.032	ND(0.0020)	ND(0.0030)	ND(0.0069)
HMW-042B	Main Sand	11/19/13	ND(0.040)	0.84	0.26	3.1	ND(0.040)	ND(0.013)	ND(0.0080)
		6/26/14	ND(0.040)	1.2	0.25	2.7	--	0.0070	ND(0.0069)
		8/30/15	ND(0.0020)	0.012	ND(0.0050)	0.029	--	0.0031	ND(0.0069)
HMW-044C[2]	Main Sand	5/8/14	25 J	2.1 J	0.70 J	5.9 J	ND(0.50)	--	--
		1/27/15	24	2.3 J	0.72 J	5.5	ND(1.0)	--	--
		2/26/15	37	2.3	0.78	5.5	ND(1.0)	--	--
		3/27/15	32	2.0	0.69	4.8	ND(1.0)	--	--

TABLE 3. DISSOLVED PHASE CONSTITUENTS OF CONCERN ANALYTICAL RESULTS SUMMARY
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Location	Hydrostratigraphic Unit	Date	Benzene (mg/L)	Ethylbenzene (mg/L)	Toluene (mg/L)	Xylenes, Total (mg/L)	MTBE (mg/L)	Arsenic (mg/L)	Lead (mg/L)
HMW-044C[2]	Main Sand	4/28/15	23	1.8	0.58	3.9	ND(1.0)	--	--
		5/28/15	25	2.2	0.68	5.4	ND(1.0)	--	--
		6/24/15	34	2.6	0.76	5.4	ND(1.0)	--	--
HMW-044D[2]	Main Sand	11/21/13	0.027	ND(0.050)	0.010 J	ND(0.050) UJ	ND(0.020)	--	--
		7/7/14	0.062	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.020)	ND(0.0010)	ND(0.0069)
		1/27/15	0.0010 J	ND(0.050)	ND(0.050)	ND(0.0050)	ND(0.020)	--	--
		2/24/15	0.0026	ND(0.050)	ND(0.050)	0.0012	0.00050	--	--
		3/27/15	0.0090	0.0019	ND(0.050)	0.0032	ND(0.020)	--	--
		4/28/15	0.0028	ND(0.050)	ND(0.050)	0.0020	ND(0.020)	--	--
		5/29/15	0.032	0.0092	0.0016	0.023	ND(0.020)	--	--
		6/24/15	0.012	ND(0.0010)	ND(0.0010)	0.0015	ND(0.020)	--	--
		7/23/15	0.013	ND(0.050)	ND(0.050)	ND(0.0050)	ND(0.020)	--	--
		8/29/15	0.030	0.0012	ND(0.0010)	0.0028	ND(0.020)	--	--
HMW-048A	North Olive	6/27/14	2.8	4.2	0.12	11	ND(0.10)	0.31	0.37
		6/25/15	1.2	4.0 J-	0.071 J-	8.8	ND(0.040)	--	--
HMW-049B[3]	B/C Clay	8/31/15	0.091 J-	0.094 J-	ND(0.010) UJ	0.025 J-	ND(0.020) UJ	--	--
HMW-049C	EPA	11/21/13	0.15	0.86	0.13	1.1	0.025	0.0067	0.0056 J
Duplicate		11/21/13	0.14	0.79	0.12	1.1	0.026	0.0062	0.0058 J
		1/28/15	0.0046	ND(0.0050)	ND(0.0050)	0.011	0.045	--	--
HMW-052B	Main Sand	9/11/14	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0020)	ND(0.0010)	ND(0.0069)
		6/25/15	0.0022	ND(0.0010) UJ	ND(0.0010) UJ	0.0012 J	ND(0.0020)	--	--

TABLE 3. DISSOLVED PHASE CONSTITUENTS OF CONCERN ANALYTICAL RESULTS SUMMARY
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Location	Hydrostratigraphic Unit	Date	Benzene (mg/L)	Ethylbenzene (mg/L)	Toluene (mg/L)	Xylenes, Total (mg/L)	MTBE (mg/L)	Arsenic (mg/L)	Lead (mg/L)
HMW-052C	Main Sand	11/20/13	0.0027 J	0.0032 J	0.0082	0.016 J	ND(0.0020)	ND(0.0030)	ND(0.0069)
		6/26/14	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0020)	ND(0.0030)	ND(0.0069)
		9/23/15	ND(0.0020)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0020)	0.0010 J	ND(0.0010)
MP-034B	Rand	6/30/14	0.33	0.099	0.062	1.3	--	0.0086	ND(0.0069)
MP-042B	Rand	6/30/14	2.3	0.54	ND(0.10)	2.3	--	0.011	ND(0.0069)
MP-049C	Main Sand	7/3/14	0.24	0.063	0.17	0.97	ND(0.040)	0.0013	ND(0.0069)
MP-056A	North Olive	9/11/14	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0020)	ND(0.0010)	ND(0.0069)
MP-056B	Rand	6/25/15	3.1	1.3 J-	5.1 J-	8.3	ND(0.10)	--	--
MP-063C	Main Sand	11/19/13	ND(0.0020)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0020)	ND(0.013)	ND(0.0080)
		7/3/14	ND(0.0020)	ND(0.0050)	ND(0.0050)	ND(0.0050)	--	0.0012	ND(0.0069)
		6/25/15	0.0074	0.012	0.0016 J	0.026	ND(0.0020)	0.00090 J	ND(0.0069)
MP-065C	Main Sand	11/19/13	ND(0.0020)	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0020)	ND(0.013)	ND(0.0080)
		7/8/14	ND(0.0020)	ND(0.0050)	ND(0.0050)	ND(0.0050)	--	ND(0.0010)	ND(0.040)
		8/30/15	ND(0.0020)	ND(0.0050)	ND(0.0050)	ND(0.0050)	--	0.00070 J	ND(0.0069)
MP-078D	Main Sand	11/20/13	0.65	ND(0.10)	0.035 J	0.061 J	ND(0.040)	0.024	ND(0.0080)
MP-081B[3]	Main Silt	7/24/15	0.0016 J	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0020)	--	--
MP-081C[3]	Main Sand	7/1/14	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0020)	ND(0.0010)	ND(0.0069)
		6/25/15	0.0018 J	0.0013 J-	0.0020 J-	0.0064	ND(0.0020)	--	--

TABLE 3. DISSOLVED PHASE CONSTITUENTS OF CONCERN ANALYTICAL RESULTS SUMMARY
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Location	Hydrostratigraphic Unit	Date	Benzene (mg/L)	Ethylbenzene (mg/L)	Toluene (mg/L)	Xylenes, Total (mg/L)	MTBE (mg/L)	Arsenic (mg/L)	Lead (mg/L)
MP-083B	Rand	8/31/15	11 J-	0.69 J-	1.0 J-	4.2 J-	ND(0.40) UJ	–	–
MP-083C	Main Sand	11/19/13	7.5 J	1.8	14 J	8.9	ND(0.040)	ND(0.013)	ND(0.0080)
		7/7/14	4.3	1.8	8.3	7.6	–	0.0037	ND(0.040)
		8/30/15	8.0	1.9	13	8.1	–	0.0047	ND(0.0069)
MP-085A	North Olive	9/11/14	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0020)	0.063	ND(0.0069)
MP-085B	Rand	11/21/13	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0011) UJ	ND(0.0020)	0.028	0.0062 J
MP-085C	EPA	11/21/13	0.054	2.6	0.24	6.7	ND(0.040)	0.0025 J	0.013
MP-089A[3]	A Clay	6/30/14	ND(0.0020)	ND(0.0010)	0.0012	0.0023	ND(0.0020)	ND(0.0030)	ND(0.0069)
		6/25/15	0.0017 J	ND(0.0010) UJ	0.0017 J-	0.0032 J	ND(0.0020)	–	–
MP-092C[3]	North Olive	7/23/15	0.0017 J	ND(0.0050)	ND(0.0050)	ND(0.0050)	ND(0.0020)	–	–
MP-092D	Multiple Strata	6/27/14	ND(0.0020)	ND(0.0010)	ND(0.0010)	0.0023	ND(0.0020)	ND(0.0030)	ND(0.0069)
		7/1/14	ND(0.0020)	ND(0.0010)	ND(0.0010)	ND(0.0010)	ND(0.0020)	ND(0.0010)	ND(0.0069)
		9/1/15	ND(0.0020) UJ	ND(0.0010) UJ	ND(0.0010) UJ	ND(0.0010) UJ	ND(0.0020) UJ	–	–
MP-133[2]	Main Sand	2/19/14	33 J	2.1	1.6	8.2	ND(0.50)	0.036 J	ND(0.0069)
		4/1/14	32	2.3	2.1	8.5	ND(0.50)	–	–
		5/8/14	31 J	2.1 J	0.75 J	7.4 J	ND(0.50)	–	–
		1/27/15	22	2.1	0.88 J	6.5	ND(0.40)	–	–
		2/26/15	41	2.3	1.0	7.6	ND(0.40)	–	–
		3/27/15	34	1.9	0.74	6.4	ND(0.40)	–	–

TABLE 3. DISSOLVED PHASE CONSTITUENTS OF CONCERN ANALYTICAL RESULTS SUMMARY
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Location	Hydrostratigraphic Unit	Date	Benzene (mg/L)	Ethylbenzene (mg/L)	Toluene (mg/L)	Xylenes, Total (mg/L)	MTBE (mg/L)	Arsenic (mg/L)	Lead (mg/L)
MP-133[2]	Main Sand	4/29/15	32	2.0	0.78	6.7	ND(1.0)	--	--
		5/29/15	35	2.5	0.81	7.7	ND(1.0)	--	--
		6/24/15	39	2.3	0.83	6.5	ND(1.0)	--	--
MP-134[2]	Main Sand	2/19/14	28 J	1.8	0.66 J	4.8	ND(0.50)	0.032 J	0.021
Duplicate		2/19/14	22 J	1.4	0.52 J	3.8	ND(0.50)	0.038 J	0.022
		4/1/14	26	1.8	0.69	6.0	ND(0.50)	--	--
Duplicate		4/1/14	27	1.8	0.71	6.1	ND(0.50)	--	--
		5/8/14	26 J	1.6 J	0.49 J	4.6 J	ND(0.50)	--	--
		3/26/15	26	1.2	0.31	3.0	ND(0.40)	--	--
		4/28/15	29	1.7	0.39	3.8	ND(0.40)	--	--
		5/29/15	27	1.7	0.42	3.8	ND(0.40)	--	--
		6/24/15	26	1.3	0.35	3.0	ND(0.40)	--	--
		7/23/15	23	0.8	0.30	1.7	ND(0.40)	--	--
MP-135[2]	Main Sand	11/20/13	28	1.8	1.1	5.2	ND(0.50)	--	--
		4/1/14	29	2.1	0.74	5.8	ND(0.50)	--	--
		5/8/14	32 J	1.9 J	0.71 J	5.0 J	ND(0.50)	--	--
Duplicate		5/8/14	30 J	1.7 J	0.65 J	4.5 J	ND(0.50)	--	--
		1/26/15	20	1.6	0.83 J	4.1	ND(0.40)	--	--
		2/24/15	32	1.4	0.63	3.7	ND(0.40)	--	--
		3/26/15	27	1.2	0.49	2.8	ND(0.40)	--	--
		4/28/15	30	1.9	0.64	3.8	ND(0.40)	--	--
		5/29/15	27	1.8	0.56	3.5	ND(0.40)	--	--
		6/24/15	28	1.9	0.56	3.6	ND(0.40)	--	--
		7/23/15	25	1.2	0.46	2.3	ND(0.40)	--	--
		8/29/15	20	1.3	0.38	2.4	ND(0.40)	--	--

TABLE 3. DISSOLVED PHASE CONSTITUENTS OF CONCERN ANALYTICAL RESULTS SUMMARY
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Location	Hydrostratigraphic Unit	Date	Benzene (mg/L)	Ethylbenzene (mg/L)	Toluene (mg/L)	Xylenes, Total (mg/L)	MTBE (mg/L)	Arsenic (mg/L)	Lead (mg/L)
MP-136[2]	Main Sand	2/19/14	28 J	1.5	0.87 J	4.8	ND(0.50)	0.036 J	0.0071
		4/1/14	23	1.3	0.77	3.9	ND(0.50)	–	–
		5/8/14	24 J	1.1 J	0.60 J	3.3 J	ND(0.50)	–	–
		2/24/15	34	1.6	0.97	5.1	ND(0.40)	–	–
		3/26/15	26	0.92	0.45	2.5	ND(0.40)	–	–
		4/28/15	27	1.2	0.55	3.4	ND(0.40)	–	–
		5/29/15	21	1.1	0.51	3.0	ND(0.40)	–	–
MP-137[2]	Main Sand	11/19/13	23	1.9	6.9	10	ND(0.50)	–	–
		4/2/14	20	1.1	0.66	4.0	ND(0.50)	–	–
		5/6/14	19 J	0.91 J	0.74 J	3.1 J	ND(0.50)	–	–
		1/26/15	19	1.6	0.71 J	5.4	ND(0.40)	–	–
		2/24/15	31	1.2	1.2	4.4	ND(0.40)	–	–
		3/27/15	27	0.92	1.7	2.8	ND(0.40)	–	–
		4/29/15	26	1.0	0.93	3.0	ND(0.40)	–	–
		5/29/15	23	0.93	1.0	2.8	ND(0.40)	–	–
		6/23/15	24	0.98	0.58	2.7	ND(0.40)	–	–
		7/22/15	21	0.31	0.38	0.68	ND(0.40)	–	–

Notes:

[1] - Sentinel Groundwater Monitoring Location

[2] - Area A Additional LNAPL Recovery Pilot Test Groundwater Monitoring Location

[3] - Monitoring location identified in the July 2, 2009 USEPA comments to the revised draft *Quarterly Ground Water Sampling and Gauging Plan* submitted by the RAM Group of Gannett Fleming

MTBE - methyl tert-buytl ether

mg/L - milligrams per liter

ND - non-detect at the indicated reporting limit in parenthesis

J - estimated concentration

J- - estimated concentration may be biased low

UJ - estimated concentration below the reporting limit

TABLE 4. DISSOLVED PHASE TOTAL PETROLEUM HYDROCARBON ANALYTICAL RESULTS SUMMARY HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Location	Hydrostratigraphic Unit	Date	Diesel Range Organics (mg/L)	Gasoline Range Organics (mg/L)
HMW-039C	Main Sand	2/20/14	0.20	ND(0.50)
HMW-040C	Main Sand	11/20/13	0.24	0.48
		1/30/15	0.37	ND(0.20)
		9/23/15	ND(0.20)	ND(0.40)
HMW-041B	Main Sand	11/19/13	0.92	130
		7/7/14	1.0	ND(5.0)
		8/30/15	0.57	1.1
HMW-042B	Main Sand	11/19/13	1.2	15
		6/26/14	2.0	15
		8/30/15	0.28	0.24 J
MP-034B	Rand	6/30/14	3.8	5.1
MP-042B	Rand	6/30/14	3.0	19
MP-063C	Main Sand	11/19/13	ND(0.20)	ND(0.20)
		7/3/14	ND(0.20)	ND(0.50)
		6/25/15	ND(0.20)	ND(0.20)
MP-065C	Main Sand	11/19/13	ND(0.0020)	ND(0.0020)
		7/8/14	ND(0.0020)	ND(0.50)
		8/30/15	ND(0.0020)	ND(0.50)
MP-078D	Main Sand	11/20/13	2.2	ND(4.0)
MP-083C	Main Sand	11/19/13	3.9	87
		7/7/14	4.1	58
		8/30/15	3.5	71

Notes:

mg/L - milligrams per liter

ND - non-detect at the indicated reporting limit in parenthesis

J - estimated concentration

TABLE 5. DISSOLVED PHASE NATURAL ATTENUATION INDICATORS ANALYTICAL RESULTS SUMMARY
HARTFORD PETROLUEM RELEASE SITE, HARTFORD, ILLINOIS

Location ID	Hydrostratigaphic Unit	Date	Sulfate (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Iron, Ferrous (mg/L)	Manganese, Dissolved (mg/L)	Manganese, Total (mg/L)	Carbon Dioxide (mg/L)	Methane (mg/L)
HMW-039C	Main Sand	2/20/14	ND(6.0)	ND(0.040) R	--	3.8 J	0.26	0.28	17 J	1.2
HMW-040C	Main Sand	11/20/13	36 J	0.15	ND(0.050)	0.029 J	0.23	0.28	--	0.055
		1/30/15	75	ND(0.040) UJ	ND(0.050)	0.045 J	0.012	0.089	--	ND(0.0020)
		9/23/15	41	2.9	ND(0.050)	0.035 J-	0.011	0.11	46 J	ND(0.000010J)
HMW-041B	Main Sand	11/19/13	9.0 J	0.031 J	ND(0.050)	13 J	0.82	0.89	--	0.48
		7/7/14	ND(6.0) UJ	ND(0.040)	ND(0.050)	12	1.0	1.1	220	1.6
		8/30/15	34	0.031 J	ND(0.050)	21 J-	1.7	1.8	240 J	1.1
HMW-042B	Main Sand	11/19/13	140	0.034 J	ND(0.050) UJ	8.5 J	0.65	0.70	--	0.29
		6/26/14	39 J	ND(0.040)	ND(0.050)	8.4 J	0.78	0.83	140	1.1
		8/30/15	120	2.2 J	1.3	0.031 J-	0.17	0.18	50 J	0.15
MP-034B	Rand	6/30/14	12	ND(0.040)	ND(0.050)	7.9 J	1.2	1.2	87	0.47
MP-042B	Rand	6/30/14	6.0	ND(0.040)	ND(0.050)	11	2.6	2.4	200	1.5
MP-063C	Main Sand	11/19/13	36 J	0.75 J	ND(0.050) UJ	0.037 J	0.20	0.22	--	0.0020 J
		7/3/14	70	0.84 J	0.060	3.0	0.75	0.85	92	0.0041
		6/25/15	57	14 J	0.62	0.028 J-	0.83	0.86	55	0.0016 J
MP-065C	Main Sand	11/19/13	150	2.5 J	0.14 J	0.014 J	0.66	0.76	--	0.0027
		7/8/14	100	ND(0.040)	ND(0.050)	ND(0.010)	0.66	1.2	69 J	0.0030
		8/30/15	67	1.6	0.030 J	ND(0.010) UJ	0.088	0.094	150 J	ND(0.0020)
MP-078D	Main Sand	11/20/13	8.0 J	0.014 J	ND(0.050)	29 J	1.8	2.0	--	2.3

TABLE 5. DISSOLVED PHASE NATURAL ATTENUATION INDICATORS ANALYTICAL RESULTS SUMMARY
HARTFORD PETROLUEM RELEASE SITE, HARTFORD, ILLINOIS

Location ID	Hydrostratigaphic Unit	Date	Sulfate (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Iron, Ferrous (mg/L)	Manganese, Dissolved (mg/L)	Manganese, Total (mg/L)	Carbon Dioxide (mg/L)	Methane (mg/L)
MP-083C	Main Sand	11/19/13	7.0 J	0.15	ND(0.050)	24 J	1.1	1.2	–	0.66
		7/7/14	ND(6.0) UJ	ND(0.040)	ND(0.25)	19	1.0	1.1	250	3.1
		8/30/15	ND(6.0)	0.030 J	ND(0.050)	22 J-	1.2	1.2	250 J	2.7

Notes:

MTBE - methyl tert-buytl ether

mg/L - milligrams per liter

ND - non-detect at the indicated reporting limit in parenthesis

J - estimated concentration

J- - estimated concentration may be biased low

UJ - estimated concentration below the reporting limit

R - Rejected

TABLE 6. FLUID LEVEL MEASUREMENTS FOR WELLS WITH LNAPL, NORTH OLIVE STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Measuring Point Elevation (ft-amsl)	Date	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)
HMW-044A	N. Olive	429.50	9/3/13	16.16	--	--	413.34
			9/9/13	16.18	--	--	413.32
			9/16/13	16.18	--	--	413.32
			9/23/13	16.11	--	--	413.39
			9/30/13	16.11	--	--	413.39
			10/7/13	16.12	--	--	413.38
			10/14/13	16.12	--	--	413.38
			10/21/13	16.12	--	--	413.38
			10/28/13	16.12	--	--	413.38
			11/4/13	16.13	--	--	413.37
			11/11/13	16.12	--	--	413.38
			11/18/13	16.15	--	--	413.35
			11/25/13	16.13	--	--	413.37
			12/2/13	16.14	--	--	413.36
			12/9/13	16.35	16.15	0.20	413.15
			12/17/13	16.15	--	--	413.35
			12/24/13	16.13	--	--	413.37
			12/31/13	16.15	--	--	413.35
			1/10/14	16.15	--	--	413.35
			1/13/14	16.16	--	--	413.34
			1/23/14	16.16	--	--	413.34
			1/30/14	16.15	--	--	413.35
			2/20/14	16.22	--	--	413.28
			2/28/14	16.20	--	--	413.30
			3/7/14	16.19	--	--	413.31
			3/10/14	16.20	--	--	413.30
			3/11/14	16.30	--	--	413.20
			3/13/14	16.20	--	--	413.30
			3/17/14	16.20	--	--	413.30
			3/19/14	16.23	--	--	413.27
			3/21/14	16.20	--	--	413.30
			3/24/14	16.21	--	--	413.29
			3/26/14	16.22	--	--	413.28
			3/28/14	16.21	--	--	413.29
			3/31/14	16.23	--	--	413.27
			4/4/14	16.22	--	--	413.28
			4/10/14	16.23	--	--	413.27
			4/14/14	16.23	--	--	413.27
			4/21/14	16.23	--	--	413.27
			4/28/14	16.25	--	--	413.25
			5/5/14	16.26	--	--	413.24
			5/12/14	16.21	--	--	413.29

TABLE 6. FLUID LEVEL MEASUREMENTS FOR WELLS WITH LNAPL, NORTH OLIVE STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Measuring Point Elevation (ft-amsl)	Date	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)
HMW-044A	N. Olive	429.50	5/12/14	16.21	--	--	413.29
			5/20/14	16.22	--	--	413.28
			5/27/14	16.22	--	--	413.28
			6/2/14	16.23	--	--	413.27
			6/12/14	Dry	--	--	--
			6/17/14	16.23	--	--	413.27
			6/23/14	16.23	--	--	413.27
			7/11/14	16.23	--	--	413.27
			7/14/14	16.22	--	--	413.28
			7/28/14	16.24	--	--	413.26
			8/5/14	11.23	--	--	418.27
			8/12/14	16.24	--	--	413.26
			8/18/14	16.21	--	--	413.29
			8/25/14	16.24	--	--	413.26
			9/2/14	16.23	--	--	413.27
			9/23/14	16.24	--	--	413.26
			9/30/14	16.25	--	--	413.25
			10/16/14	16.24	--	--	413.26
			10/28/14	16.22	--	--	413.28
			11/7/14	16.26	--	--	413.24
			11/11/14	16.23	--	--	413.27
			11/28/14	16.24	--	--	413.26
			12/4/14	16.23	--	--	413.27
			12/11/14	16.25	--	--	413.25
			12/18/14	16.25	--	--	413.25
			12/24/14	16.25	--	--	413.25
			12/29/14	16.23	--	--	413.27
			1/9/15	16.25	--	--	413.25
			1/13/15	16.19	--	--	413.31
			1/19/15	16.18	--	--	413.32
			1/22/15	16.18	--	--	413.32
			1/30/15	16.21	--	--	413.29
			2/3/15	16.20	--	--	413.30
			2/10/15	16.20	--	--	413.30
			2/20/15	16.21	--	--	413.29
			2/25/15	16.21	--	--	413.29
			3/2/15	Dry	--	--	--
			3/9/15	16.21	--	--	413.29
			3/10/15	16.44	--	--	413.06
			3/11/15	16.16	--	--	413.34
			3/17/15	16.20	--	--	413.30
			3/23/15	16.20	--	--	413.30

TABLE 6. FLUID LEVEL MEASUREMENTS FOR WELLS WITH LNAPL, NORTH OLIVE STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Measuring Point Elevation (ft-amsl)	Date	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)
HMW-054A	N. Olive	429.54	3/30/15	16.23	--	--	413.27
			4/7/15	16.20	--	--	413.30
			7/20/15	16.18	--	--	413.32
			9/27/13	15.57	--	--	413.97
			10/2/13	15.58	--	--	413.96
			10/23/13	15.59	--	--	413.95
			11/20/13	15.58	--	--	413.96
			12/18/13	15.60	15.59	0.01	413.94
			1/14/14	14.60	--	--	414.94
			4/23/14	15.60	--	--	413.94
			5/13/14	15.60	--	--	413.94
			8/5/14	15.61	--	--	413.93
			10/29/14	15.64	--	--	413.90
			3/5/15	15.65	--	--	413.89
			4/7/15	15.65	--	--	413.89
			7/21/15	15.64	--	--	413.90
MP-047A	N. Olive	429.12	9/25/13	Dry	--	--	--
			10/22/13	Dry	--	--	--
			11/19/13	Dry	--	--	--
			12/16/13	Dry	--	--	--
			1/22/14	Dry	--	--	--
			4/22/14	Dry	--	--	--
			5/13/14	Dry	--	--	--
			8/4/14	Dry	--	--	--
			10/27/14	Dry	--	--	--
			3/4/15	Dry	--	--	--
			4/7/15	Dry	--	--	--
			7/20/15	21.39	18.68	2.71	407.73
MP-108B	N. Olive	429.62	5/19/14	13.45	13.14	0.31	416.17
			8/4/14	Dry	--	--	--
			10/27/14	13.30	13.04	0.26	416.32
			3/9/15	Dry	--	--	--
			4/6/15	13.54	13.40	0.14	416.08
			7/20/15	12.85	12.76	0.09	416.77

Notes:

ft-amsl - feet above mean sea level

ft-bmp - feet below measuring point

TABLE 7. FLUID LEVEL MEASUREMENTS FOR WELLS WITH LNAPL, RAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Measuring Point Elevation (ft-amsl)	Date	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)
HMW-044B	Rand	429.41	9/3/13	23.40	--	--	406.01
			9/9/13	23.42	--	--	405.99
			9/16/13	23.45	--	--	405.96
			9/23/13	23.40	--	--	406.01
			9/30/13	23.44	--	--	405.97
			10/7/13	23.41	--	--	406.00
			10/14/13	23.40	--	--	406.01
			10/21/13	23.41	--	--	406.00
			10/28/13	23.41	--	--	406.00
			11/4/13	23.41	--	--	406.00
			11/11/13	23.41	--	--	406.00
			11/18/13	23.42	--	--	405.99
			11/25/13	23.42	--	--	405.99
			12/2/13	23.42	--	--	405.99
			12/9/13	23.42	--	--	405.99
			12/17/13	23.43	--	--	405.98
			12/24/13	23.43	--	--	405.98
			12/31/13	23.45	--	--	405.96
			1/10/14	23.43	--	--	405.98
			1/13/14	23.43	--	--	405.98
			1/23/14	23.43	--	--	405.98
			1/30/14	23.45	--	--	405.96
			2/20/14	23.46	--	--	405.95
			2/28/14	23.45	--	--	405.96
			3/7/14	23.45	--	--	405.96
			3/10/14	23.46	--	--	405.95
			3/11/14	23.25	--	--	406.16
			3/13/14	23.46	--	--	405.95
			3/17/14	23.46	--	--	405.95
			3/19/14	23.45	--	--	405.96
			3/21/14	23.45	--	--	405.96
			3/24/14	23.46	--	--	405.95
			3/26/14	23.47	--	--	405.94
			3/28/14	23.46	--	--	405.95
			3/31/14	23.48	--	--	405.93
			4/4/14	23.48	--	--	405.93
			4/10/14	23.48	--	--	405.93
			4/14/14	23.50	--	--	405.91
			4/21/14	23.48	--	--	405.93
			4/28/14	23.49	--	--	405.92
			5/5/14	23.48	--	--	405.93
			5/12/14	23.46	--	--	405.95

TABLE 7. FLUID LEVEL MEASUREMENTS FOR WELLS WITH LNAPL, RAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Measuring Point Elevation (ft-amsl)	Date	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)
HMW-044B	Rand	429.41	5/12/14	23.43	--	--	405.98
			5/20/14	23.45	--	--	405.96
			5/27/14	23.48	--	--	405.93
			6/2/14	23.48	--	--	405.93
			6/12/14	Dry	--	--	--
			6/17/14	23.48	--	--	405.93
			6/23/14	23.47	--	--	405.94
			7/11/14	23.48	--	--	405.93
			7/14/14	23.47	--	--	405.94
			7/28/14	23.48	--	--	405.93
			8/5/14	23.48	--	--	405.93
			8/12/14	23.48	--	--	405.93
			8/18/14	23.48	--	--	405.93
			8/25/14	23.48	--	--	405.93
			9/2/14	23.48	--	--	405.93
			9/23/14	23.49	--	--	405.92
			9/30/14	23.48	--	--	405.93
			10/16/14	23.49	--	--	405.92
			10/28/14	23.48	--	--	405.93
			11/7/14	23.48	--	--	405.93
			11/11/14	23.49	--	--	405.92
			11/28/14	23.50	--	--	405.91
			12/4/14	28.37	28.20	0.17	401.04
			12/11/14	23.48	--	--	405.93
			12/18/14	23.48	--	--	405.93
			12/24/14	23.48	--	--	405.93
			12/29/14	23.48	--	--	405.93
			1/9/15	23.46	--	--	405.95
			1/13/15	23.43	23.41	0.02	405.98
			1/19/15	23.41	--	--	406.00
			1/22/15	23.42	--	--	405.99
			1/30/15	23.42	--	--	405.99
			2/3/15	23.41	--	--	406.00
			2/10/15	23.43	--	--	405.98
			2/20/15	23.43	--	--	405.98
			2/25/15	23.46	--	--	405.95
			3/2/15	23.46	--	--	405.95
			3/9/15	23.46	--	--	405.95
			3/10/15	23.45	--	--	405.96
			3/11/15	23.46	--	--	405.95
			3/17/15	23.46	--	--	405.95
			3/23/15	23.46	--	--	405.95

TABLE 7. FLUID LEVEL MEASUREMENTS FOR WELLS WITH LNAPL, RAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Measuring Point Elevation (ft-amsl)	Date	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)
HMW-044B	Rand	429.41	3/30/15	23.45	--	--	405.96
			4/7/15	23.46	--	--	405.95
			7/20/15	20.48	20.00	0.48	408.93
HMW-048B	Rand	429.18	10/1/13	18.30	--	--	410.88
			11/14/13	18.80	--	--	410.38
			1/14/14	14.97	--	--	414.21
			2/17/14	18.11	--	--	411.07
			3/20/14	16.42	--	--	412.76
			4/25/14	12.08	--	--	417.10
			5/12/14	11.06	--	--	418.12
			6/3/14	10.63	--	--	418.55
			7/24/14	11.41	--	--	417.77
			8/4/14	12.35	--	--	416.83
			9/8/14	9.98	--	--	419.20
			10/27/14	9.65	--	--	419.53
			11/20/14	12.18	--	--	417.00
			12/23/14	12.76	--	--	416.42
			1/23/15	12.61	--	--	416.57
			2/27/15	15.73	--	--	413.45
			3/9/15	15.73	--	--	413.45
			4/6/15	11.20	--	--	417.98
			5/12/15	10.60	--	--	418.58
			6/23/15	8.50	--	--	420.68
			7/20/15	6.35	6.34	0.01	422.83
			8/24/15	8.70	--	--	420.48
			9/21/15	12.49	--	--	416.69
MP-009D	Rand	430.00	10/1/13	22.32	21.24	1.08	407.68
			1/13/14	23.35	22.46	0.89	406.65
			5/13/14	20.30	19.82	0.48	409.70
			8/4/14	19.71	19.41	0.30	410.29
			10/27/14	17.60	--	--	412.40
			3/9/15	20.90	20.78	0.12	409.10
			4/7/15	9.15	9.10	0.05	420.85
			7/20/15	12.64	--	--	417.36
MP-029B	Rand	429.43	5/12/14	Dry	--	--	--
			8/4/14	19.43	--	--	410.00
			10/27/14	17.13	17.11	0.02	412.30
			3/5/15	Dry	--	--	--
			4/6/15	Dry	--	--	--
			7/20/15	12.86	--	--	416.57

TABLE 7. FLUID LEVEL MEASUREMENTS FOR WELLS WITH LNAPL, RAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Measuring Point Elevation (ft-amsl)	Date	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)
MP-029C	Rand	429.39	9/6/13	21.75	--	--	407.64
			9/13/13	22.30	--	--	407.09
			9/23/13	22.93	--	--	406.46
			9/27/13	23.10	--	--	406.29
			10/1/13	23.25	--	--	406.14
			11/14/13	23.96	--	--	405.43
			12/11/13	24.30	24.29	0.01	405.09
			1/13/14	23.54	--	--	405.85
			2/17/14	22.04	--	--	407.35
			3/20/14	24.05	--	--	405.34
			4/25/14	21.98	--	--	407.41
			5/12/14	20.80	--	--	408.59
			6/3/14	19.98	19.97	0.01	409.41
			7/24/14	18.85	--	--	410.54
			8/4/14	20.11	--	--	409.28
			9/8/14	19.11	--	--	410.28
			10/27/14	17.72	--	--	411.67
			11/20/14	20.80	--	--	408.59
			12/23/14	20.13	--	--	409.26
			1/23/15	21.64	--	--	407.75
			2/27/15	23.23	--	--	406.16
			3/5/15	23.23	--	--	406.16
			4/6/15	21.00	--	--	408.39
			5/12/15	21.06	--	--	408.33
			6/23/15	16.98	--	--	412.41
			7/20/15	13.06	--	--	416.33
			8/24/15	17.48	--	--	411.91
			9/21/15	20.68	--	--	408.71
MP-041B	Rand	431.23	10/1/13	25.72	--	--	405.51
			1/14/14	25.74	25.67	0.07	405.49
			5/13/14	25.48	25.35	0.13	405.75
			8/4/14	24.93	24.68	0.25	406.30
			10/28/14	24.75	24.63	0.12	406.48
			3/9/15	Dry	--	--	--
			4/7/15	Dry	--	--	--
			7/20/15	20.95	20.94	0.01	410.28
MP-044C	Rand	430.54	10/1/13	23.61	--	--	406.93
			1/14/14	24.48	24.11	0.37	406.06
			5/13/14	24.51	24.22	0.29	406.03
			8/4/14	Dry	--	--	--
			10/28/14	24.52	24.25	0.27	406.02

TABLE 7. FLUID LEVEL MEASUREMENTS FOR WELLS WITH LNAPL, RAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Measuring Point Elevation (ft-amsl)	Date	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)
MP-044C	Rand	430.54	3/4/15	Dry	--	--	--
			4/7/15	Dry	--	--	--
			7/20/15	20.32	--	--	410.22
MP-045B	Rand	430.04	10/1/13	23.35	--	--	406.69
			5/13/14	Dry	--	--	--
			8/4/14	Dry	--	--	--
			10/28/14	Dry	--	--	--
			3/4/15	Dry	--	--	--
			4/7/15	Dry	--	--	--
			7/20/15	23.24	19.60	3.64	406.80
MP-046B	Rand	429.65	5/13/14	24.15	23.76	0.39	405.50
			8/4/14	24.01	23.51	0.50	405.64
			10/27/14	24.10	23.67	0.43	405.56
			3/4/15	24.10	23.87	0.23	405.55
			4/7/15	24.10	23.77	0.33	405.55
			7/20/15	21.49	18.85	2.64	408.16
MP-047B	Rand	429.05	5/13/14	22.29	22.16	0.13	406.76
			8/4/14	Dry	--	--	--
			10/27/14	Dry	--	--	--
			3/4/15	21.93	21.90	0.03	407.12
			4/7/15	22.02	--	--	407.03
			7/20/15	Dry	--	--	--
MP-051C	Rand	430.93	10/1/13	24.50	--	--	406.43
			1/14/14	24.53	--	--	406.40
			5/13/14	24.52	--	--	406.41
			8/4/14	Dry	--	--	--
			10/28/14	24.54	--	--	406.39
			3/5/15	24.60	--	--	406.33
			4/7/15	Dry	--	--	--
			7/20/15	24.55	20.49	4.06	406.38
MP-053B	Rand	430.60	5/13/14	24.49	24.31	0.18	406.11
			8/5/14	24.27	24.26	0.01	406.33
			10/28/14	24.50	24.32	0.18	406.10
			3/5/15	24.48	24.39	0.09	406.12
			4/7/15	Dry	--	--	--
			7/20/15	21.18	--	--	409.42

TABLE 7. FLUID LEVEL MEASUREMENTS FOR WELLS WITH LNAPL, RAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Measuring Point Elevation (ft-amsl)	Date	Depth to Water (ft-bmp)	Depth to LNAPL (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)
MP-055B	Rand	429.64	10/1/13	23.70	--	--	405.94
			1/13/14	23.73	--	--	405.91
			5/12/14	23.70	--	--	405.94
			8/5/14	Dry	--	--	--
			10/28/14	23.71	--	--	405.93
			3/5/15	23.75	--	--	405.89
			4/7/15	Dry	--	--	--
			7/20/15	22.80	19.10	3.70	406.84
MP-056B	Rand	430.25	2/18/14	Dry	--	--	--
			3/20/14	Dry	--	--	--
			5/13/14	Dry	--	--	--
			6/3/14	27.07	--	--	403.18
			7/24/14	24.21	21.43	2.78	406.04
			8/5/14	25.67	25.21	0.46	404.58
			9/8/14	25.65	25.61	0.04	404.60
			10/28/14	25.36	24.98	0.38	404.89
			11/20/14	Dry	--	--	--
			12/23/14	Dry	--	--	--
			1/23/15	Dry	--	--	--
			2/27/15	Dry	--	--	--
			3/9/15	Dry	--	--	--
			4/7/15	Dry	--	--	--
			5/12/15	Dry	--	--	--
			6/23/15	22.68	--	--	407.57
			7/22/15	20.26	--	--	409.99
			8/24/15	24.41	24.12	0.29	405.84
			9/21/15	26.58	26.43	0.15	403.67

Notes:

ft-amsl - feet above mean sea level

ft-bmp - feet below measuring point

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HB-030	Main Sand	5	C Clay	28.00	431.08	9/5/13	30.32	30.71	0.39	400.37	2.32	Unconfined
						9/9/13	30.60	30.90	0.30	400.18	2.60	Unconfined
						9/10/13	--	30.99	--	400.09	--	--
						10/2/13	--	30.68	--	400.40	--	--
						1/14/14	--	33.38	--	397.70	--	--
						5/13/14	--	31.36	--	399.72	--	--
						8/4/14	27.56	30.56	3.00	400.52	-0.44	Confined
						10/28/14	27.54	29.15	1.61	401.93	-0.46	Confined
						4/7/15	33.88	33.95	0.07	397.13	5.88	Highly Unconfined
						7/22/15	20.07	29.72	9.65	401.36	-7.93	Highly Confined
						10/13/15	29.92	31.04	1.12	400.04	1.92	Unconfined
						1/7/16	21.66	23.89	2.23	407.19	-6.34	Highly Confined
HMW-008	Main Sand	6	C Clay	31.50	429.74	9/9/13	30.00	31.10	1.10	398.64	-1.50	Confined
						9/13/13	30.41	31.06	0.65	398.68	-1.09	Confined
						9/17/13	30.40	31.00	0.60	398.74	-1.10	Confined
						9/24/13	30.90	30.94	0.04	398.80	-0.60	Confined
						5/12/14	31.09	31.12	0.03	398.62	-0.41	Confined
						8/4/14	26.80	32.60	5.80	397.14	-4.70	Highly Confined
						10/31/14	27.40	31.41	4.01	398.33	-4.10	Highly Confined
						4/6/15	33.35	34.05	0.70	395.69	1.85	Unconfined
						10/13/15	29.78	32.78	3.00	396.96	-1.72	Confined
HMW-010	Main Sand	6	C Clay	31.00	430.20	9/3/13	29.70	30.60	0.90	399.60	-1.30	Confined
						9/6/13	30.00	30.60	0.60	399.60	-1.00	Confined
						9/9/13	30.25	30.60	0.35	399.60	-0.75	Confined
						9/13/13	30.70	30.80	0.10	399.40	-0.30	Confined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HMW-010	Main Sand	6	C Clay	31.00	430.20	9/23/13	31.08	31.14	0.06	399.06	0.08	Unconfined
						9/27/13	31.20	31.30	0.10	398.90	0.20	Unconfined
						10/1/13	31.40	31.42	0.02	398.78	0.40	Unconfined
						5/19/14	--	30.65	--	399.55	--	--
						8/4/14	27.01	30.45	3.44	399.75	-3.99	Confined
						10/27/14	26.23	30.48	4.25	399.72	-4.77	Highly Confined
						7/20/15	18.87	28.38	9.51	401.82	-12.13	Highly Confined
						10/13/15	29.84	30.64	0.80	399.56	-1.16	Confined
						1/6/16	18.69	30.80	12.11	399.40	-12.31	Highly Confined
HMW-014	Multiple Strata	6	C Clay	32.00	430.86	9/6/13	31.00	31.70	0.70	399.16	-1.00	Confined
						9/13/13	31.70	32.00	0.30	398.86	-0.30	Confined
						9/23/13	32.10	32.50	0.40	398.36	0.10	Unconfined
						9/27/13	32.10	32.60	0.50	398.26	0.10	Unconfined
						10/1/13	32.39	32.96	0.57	397.90	0.39	Unconfined
						1/14/14	34.30	35.86	1.56	395.00	2.30	Unconfined
						5/13/14	31.75	32.02	0.27	398.84	-0.25	Confined
						8/4/14	--	28.67	--	402.19	--	--
						10/28/14	27.95	29.30	1.35	401.56	-4.05	Highly Confined
						4/7/15	34.10	34.50	0.40	396.36	2.10	Unconfined
						7/20/15	21.88	22.67	0.79	408.19	-10.12	Highly Confined
						10/13/15	30.78	31.72	0.94	399.14	-1.22	Confined
						1/7/16	21.07	26.62	5.55	404.24	-10.93	Highly Confined
HMW-021	Multiple Strata	6	C Clay	31.50	430.05	10/1/13	--	21.02	--	409.03	--	--
						1/13/14	--	22.72	--	407.33	--	--
						5/13/14	--	20.95	--	409.10	--	--

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HMW-021	Multiple Strata	6	C Clay	31.50	430.05	8/4/14	--	19.87	--	410.18	--	--
						10/27/14	--	17.85	--	412.20	--	--
						3/9/15	--	21.10	--	408.95	--	--
						7/20/15	--	13.30	--	416.75	--	--
						10/13/15	--	20.50	--	409.55	--	--
						1/6/16	20.70	25.68	4.98	404.37	-10.80	Highly Confined
HMW-022	Main Sand	6	C Clay	31.50	430.14	9/4/13	30.10	32.70	2.60	397.44	-1.40	Confined
						9/11/13	30.75	32.90	2.15	397.24	-0.75	Confined
						9/24/13	31.40	33.20	1.80	396.94	-0.10	Confined
						9/30/13	31.70	33.40	1.70	396.74	0.20	Unconfined
						10/1/13	31.81	33.40	1.59	396.74	0.31	Unconfined
						1/13/14	33.76	36.19	2.43	393.95	2.26	Unconfined
						5/13/14	31.32	32.37	1.05	397.77	-0.18	Confined
						8/4/14	27.23	32.51	5.28	397.63	-4.27	Highly Confined
						10/27/14	26.44	31.85	5.41	398.29	-5.06	Highly Confined
						3/9/15	34.70	37.70	3.00	392.44	3.20	Unconfined
						4/7/15	33.75	34.34	0.59	395.80	2.25	Unconfined
						7/20/15	19.00	31.85	12.85	398.29	-12.50	Highly Confined
						10/13/15	30.28	32.04	1.76	398.10	-1.22	Confined
HMW-034	Multiple Strata	6	C Clay	30.00	429.83	9/5/13	29.49	30.35	0.86	399.48	-0.51	Confined
						9/9/13	29.80	30.40	0.60	399.43	-0.20	Confined
						9/10/13	30.06	30.16	0.10	399.67	0.06	Unconfined
						9/12/13	30.20	30.30	0.10	399.53	0.20	Unconfined
						9/26/13	30.77	31.00	0.23	398.83	0.77	Unconfined
						10/1/13	31.00	31.35	0.35	398.48	1.00	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HMW-034	Multiple Strata	6	C Clay	30.00	429.83	1/14/14	33.19	33.68	0.49	396.15	3.19	Unconfined
						5/19/14	--	30.23	--	399.60	--	--
						8/4/14	26.71	29.77	3.06	400.06	-3.29	Confined
						10/27/14	25.93	29.80	3.87	400.03	-4.07	Highly Confined
						3/9/15	34.32	34.90	0.58	394.93	4.32	Highly Unconfined
						4/6/15	32.85	32.96	0.11	396.87	2.85	Unconfined
						7/20/15	19.22	28.23	9.01	401.60	-10.78	Highly Confined
						10/13/15	29.50	30.25	0.75	399.58	-0.50	Confined
						1/6/16	19.82	25.88	6.06	403.95	-10.18	Highly Confined
HMW-044C	Main Sand	5	C Clay	28.00	428.21	9/3/13	27.44	28.11	0.67	400.10	-0.56	Confined
						9/9/13	27.82	28.43	0.61	399.78	-0.18	Confined
						9/16/13	28.35	29.15	0.80	399.06	0.35	Unconfined
						9/23/13	28.65	29.11	0.46	399.10	0.65	Unconfined
						9/30/13	28.95	29.05	0.10	399.16	0.95	Unconfined
						10/7/13	29.37	29.44	0.07	398.77	1.37	Unconfined
						10/14/13	29.53	29.55	0.02	398.66	1.53	Unconfined
						10/21/13	29.68	30.01	0.33	398.20	1.68	Unconfined
						10/28/13	29.91	30.00	0.09	398.21	1.91	Unconfined
						11/4/13	--	29.45	--	398.76	--	--
						11/11/13	29.90	29.98	0.08	398.23	1.90	Unconfined
						11/18/13	30.01	30.20	0.19	398.01	2.01	Unconfined
						11/25/13	29.91	30.02	0.11	398.19	1.91	Unconfined
						12/2/13	29.99	30.33	0.34	397.88	1.99	Unconfined
						12/9/13	30.38	30.68	0.30	397.53	2.38	Unconfined
						12/17/13	30.61	31.72	1.11	396.49	2.61	Unconfined
						12/24/13	30.87	31.25	0.38	396.96	2.87	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HMW-044C	Main Sand	5	C Clay	28.00	428.21	12/31/13	30.97	31.31	0.34	396.90	2.97	Unconfined
						1/10/14	31.13	31.23	0.10	396.98	3.13	Unconfined
						1/13/14	31.12	31.24	0.12	396.97	3.12	Unconfined
						1/23/14	31.40	31.71	0.31	396.50	3.40	Unconfined
						1/30/14	31.31	31.48	0.17	396.73	3.31	Unconfined
						2/20/14	--	31.91	--	396.30	--	--
						2/28/14	--	31.78	--	396.43	--	--
						3/7/14	31.21	31.22	0.01	396.99	3.21	Unconfined
						3/10/14	32.33	32.98	0.65	395.23	4.33	Highly Unconfined
						3/11/14	32.51	32.79	0.28	395.42	4.51	Highly Unconfined
						3/13/14	32.72	32.82	0.10	395.39	4.72	Highly Unconfined
						3/17/14	32.56	32.70	0.14	395.51	4.56	Highly Unconfined
						3/19/14	32.59	32.79	0.20	395.42	4.59	Highly Unconfined
						3/21/14	32.40	32.52	0.12	395.69	4.40	Highly Unconfined
						3/24/14	32.48	32.55	0.07	395.66	4.48	Highly Unconfined
						3/26/14	32.47	32.55	0.08	395.66	4.47	Highly Unconfined
						3/28/14	33.41	33.44	0.03	394.77	5.41	Highly Unconfined
						3/31/14	32.19	32.25	0.06	395.96	4.19	Highly Unconfined
						4/4/14	--	31.15	--	397.06	--	--
						4/10/14	--	30.36	--	397.85	--	--
						4/14/14	--	30.30	--	397.91	--	--
						4/21/14	--	29.99	--	398.22	--	--
						4/28/14	--	29.61	--	398.60	--	--
						5/5/14	--	29.32	--	398.89	--	--
						5/12/14	--	29.02	--	399.19	--	--
						5/12/14	--	29.09	--	399.12	--	--
						5/20/14	--	28.48	--	399.73	--	--

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HMW-044C	Main Sand	5	C Clay	28.00	428.21	5/27/14	--	28.22	--	399.99	--	--
						6/2/14	--	27.99	--	400.22	--	--
						6/12/14	--	27.22	--	400.99	--	--
						6/17/14	--	26.89	--	401.32	--	--
						6/23/14	26.66	26.67	0.01	401.54	-1.34	Confined
						7/11/14	24.02	24.61	0.59	403.60	-3.98	Confined
						7/14/14	23.33	24.25	0.92	403.96	-4.67	Highly Confined
						7/28/14	23.60	27.37	3.77	400.84	-4.40	Highly Confined
						8/5/14	25.13	28.54	3.41	399.67	-2.87	Confined
						8/12/14	25.80	28.25	2.45	399.96	-2.20	Confined
						8/18/14	26.37	28.32	1.95	399.89	-1.63	Confined
						8/25/14	27.00	28.41	1.41	399.80	-1.00	Confined
						9/2/14	27.31	28.20	0.89	400.01	-0.69	Confined
						9/23/14	24.90	27.78	2.88	400.43	-3.10	Confined
						9/30/14	25.36	28.26	2.90	399.95	-2.64	Confined
						10/16/14	24.69	27.68	2.99	400.53	-3.31	Confined
						10/28/14	24.88	28.25	3.37	399.96	-3.12	Confined
						11/7/14	26.12	28.23	2.11	399.98	-1.88	Confined
						11/11/14	26.77	29.00	2.23	399.21	-1.23	Confined
						11/28/14	28.20	28.68	0.48	399.53	0.20	Unconfined
						12/4/14	28.20	28.37	0.17	399.84	0.20	Unconfined
						12/11/14	28.65	29.17	0.52	399.04	0.65	Unconfined
						12/18/14	29.04	29.07	0.03	399.14	1.04	Unconfined
						12/24/14	29.11	29.35	0.24	398.86	1.11	Unconfined
						12/29/14	29.32	29.49	0.17	398.72	1.32	Unconfined
						1/1/15	--	29.21	--	399.00	--	--
						1/9/15	29.90	29.92	0.02	398.29	1.90	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HMW-044C	Main Sand	5	C Clay	28.00	428.21	1/13/15	31.15	31.21	0.06	397.00	3.15	Unconfined
						1/19/15	31.55	31.60	0.05	396.61	3.55	Unconfined
						1/22/15	31.87	31.89	0.02	396.32	3.87	Unconfined
						1/30/15	--	32.17	--	396.04	--	--
						2/3/15	32.23	32.25	0.02	395.96	4.23	Highly Unconfined
						2/10/15	--	32.30	--	395.91	--	--
						2/20/15	--	32.55	--	395.66	--	--
						2/25/15	--	32.62	--	395.59	--	--
						3/2/15	--	32.95	--	395.26	--	--
						3/9/15	--	32.62	--	395.59	--	--
						3/10/15	--	33.10	--	395.11	--	--
						3/11/15	--	32.07	--	396.14	--	--
						3/17/15	--	31.68	--	396.53	--	--
						3/23/15	--	31.20	--	397.01	--	--
						3/30/15	--	30.96	--	397.25	--	--
						4/7/15	--	37.70	--	390.51	--	--
						7/20/15	19.80	20.02	0.22	408.19	-8.20	Highly Confined
						10/14/15	27.47	29.04	1.57	399.17	-0.53	Confined
						1/7/16	19.04	23.46	4.42	404.75	-8.96	Highly Confined
HMW-045C	Main Sand	1	C Clay	31.40	430.87	9/6/13	32.20	33.70	1.50	397.17	0.80	Unconfined
						9/13/13	32.80	34.60	1.80	396.27	1.40	Unconfined
						9/23/13	33.20	34.60	1.40	396.27	1.80	Unconfined
						9/27/13	33.40	35.10	1.70	395.77	2.00	Unconfined
						10/3/13	33.60	35.40	1.80	395.47	2.20	Unconfined
						1/17/14	35.58	37.82	2.24	393.05	4.18	Highly Unconfined
						5/16/14	--	32.30	--	398.57	--	--

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HMW-045C	Main Sand	1	C Clay	31.40	430.87	8/7/14	30.70	31.83	1.13	399.04	-0.70	Confined
						3/6/15	36.28	39.48	3.20	391.39	4.88	Highly Unconfined
						4/6/15	35.31	35.82	0.51	395.05	3.91	Unconfined
						7/21/15	20.15	20.90	0.75	409.97	-11.25	Highly Confined
						10/12/15	--	31.83	--	399.04	--	--
						1/5/16	19.97	31.91	11.94	398.96	-11.43	Highly Confined
HMW-046C	Main Sand	1	C Clay	32.00	430.49	9/6/13	32.20	33.80	1.60	396.69	0.20	Unconfined
						9/13/13	33.00	34.00	1.00	396.49	1.00	Unconfined
						9/23/13	33.40	34.00	0.60	396.49	1.40	Unconfined
						9/27/13	33.60	34.40	0.80	396.09	1.60	Unconfined
						10/3/13	33.83	34.53	0.70	395.96	1.83	Unconfined
						1/17/14	35.60	36.52	0.92	393.97	3.60	Unconfined
						5/19/14	--	31.73	--	398.76	--	--
						8/6/14	29.80	32.02	2.22	398.47	-2.20	Confined
						10/31/14	29.55	32.22	2.67	398.27	-2.45	Confined
						3/9/15	36.56	39.09	2.53	391.40	4.56	Highly Unconfined
						4/6/15	35.35	35.85	0.50	394.64	3.35	Unconfined
						7/21/15	19.60	32.00	12.40	398.49	-12.40	Highly Confined
						10/12/15	31.75	33.39	1.64	397.10	-0.25	Confined
						1/5/16	--	19.53	--	410.96	--	--
HMW-053B	Multiple Strata	4	C Clay	26.30	429.76	9/3/13	28.40	29.70	1.30	400.06	2.10	Unconfined
						9/6/13	28.60	29.60	1.00	400.16	2.30	Unconfined
						9/9/13	28.80	29.80	1.00	399.96	2.50	Unconfined
						9/13/13	29.10	29.90	0.80	399.86	2.80	Unconfined
						9/23/13	29.70	30.60	0.90	399.16	3.40	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HMW-053B	Multiple Strata	4	C Clay	26.30	429.76	9/27/13	29.70	30.20	0.50	399.56	3.40	Unconfined
						9/30/13	29.90	30.50	0.60	399.26	3.60	Unconfined
						10/2/13	--	30.05	--	399.71	--	--
						1/14/14	--	32.20	--	397.56	--	--
						5/13/14	30.15	30.37	0.22	399.39	3.85	Unconfined
						8/5/14	25.74	30.51	4.77	399.25	-0.56	Confined
						10/29/14	25.70	29.32	3.62	400.44	-0.60	Confined
						3/5/15	33.20	33.70	0.50	396.06	6.90	Highly Unconfined
						4/7/15	31.62	31.87	0.25	397.89	5.32	Highly Unconfined
						7/21/15	19.81	24.92	5.11	404.84	-6.49	Highly Confined
						10/14/15	28.21	30.52	2.31	399.24	1.91	Unconfined
						1/7/16	18.48	28.45	9.97	401.31	-7.82	Highly Confined
HMW-054B	Main Sand	4	C Clay	29.60	429.55	9/6/13	28.70	29.30	0.60	400.25	-0.90	Confined
						9/13/13	29.20	29.80	0.60	399.75	-0.40	Confined
						9/23/13	29.69	30.09	0.40	399.46	0.09	Unconfined
						9/27/13	29.70	30.10	0.40	399.45	0.10	Unconfined
						9/30/13	29.90	30.40	0.50	399.15	0.30	Unconfined
						10/2/13	30.09	30.51	0.42	399.04	0.49	Unconfined
						1/14/14	--	32.28	--	397.27	--	--
						5/13/14	29.95	30.85	0.90	398.70	0.35	Unconfined
						8/5/14	25.70	31.22	5.52	398.33	-3.90	Confined
						10/29/14	25.49	30.85	5.36	398.70	-4.11	Highly Confined
						3/5/15	33.40	33.80	0.40	395.75	3.80	Unconfined
						4/7/15	--	31.66	--	397.89	--	--
						7/21/15	19.28	27.21	7.93	402.34	-10.32	Highly Confined
						10/14/15	28.08	31.06	2.98	398.49	-1.52	Confined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
HMW-054B	Main Sand	4	C Clay	29.60	429.55	1/7/16	17.95	31.17	13.22	398.38	-11.65	Highly Confined
IEPA-004	Main Sand	6	C Clay	26.00	430.35	9/5/13	29.00	30.80	1.80	399.55	3.00	Unconfined
						9/12/13	29.90	29.95	0.05	400.40	3.90	Unconfined
						9/26/13	30.54	30.57	0.03	399.78	4.54	Highly Unconfined
						10/1/13	30.80	30.83	0.03	399.52	4.80	Highly Unconfined
						1/14/14	32.71	34.01	1.30	396.34	6.71	Highly Unconfined
						5/13/14	30.51	31.00	0.49	399.35	4.51	Highly Unconfined
						8/4/14	26.65	29.26	2.61	401.09	0.65	Unconfined
						10/27/14	26.40	27.74	1.34	402.61	0.40	Unconfined
						3/4/15	33.61	35.10	1.49	395.25	7.61	Highly Unconfined
						4/7/15	32.53	32.98	0.45	397.37	6.53	Highly Unconfined
						7/20/15	19.37	27.25	7.88	403.10	-6.63	Highly Confined
						10/13/15	28.87	31.24	2.37	399.11	2.87	Unconfined
						1/6/16	20.63	21.96	1.33	408.39	-5.37	Highly Confined
MP-029D	Main Sand	6	C Clay	31.80	429.47	9/3/13	29.30	32.60	3.30	396.87	-2.50	Confined
						9/4/13	29.50	32.60	3.10	396.87	-2.30	Confined
						9/5/13	29.60	32.60	3.00	396.87	-2.20	Confined
						9/6/13	29.60	32.60	3.00	396.87	-2.20	Confined
						9/9/13	29.85	32.90	3.05	396.57	-1.95	Confined
						9/10/13	30.00	32.90	2.90	396.57	-1.80	Confined
						9/11/13	30.10	32.80	2.70	396.67	-1.70	Confined
						9/12/13	30.20	32.90	2.70	396.57	-1.60	Confined
						9/13/13	30.30	32.90	2.60	396.57	-1.50	Confined
						9/16/13	30.60	32.80	2.20	396.67	-1.20	Confined
						9/17/13	30.60	32.80	2.20	396.67	-1.20	Confined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-029D	Main Sand	6	C Clay	31.80	429.47	9/23/13	30.80	33.00	2.20	396.47	-1.00	Confined
						9/27/13	31.00	32.90	1.90	396.57	-0.80	Confined
						9/30/13	31.10	33.10	2.00	396.37	-0.70	Confined
						10/1/13	31.22	31.23	0.01	398.24	-0.58	Confined
						1/13/14	33.30	35.55	2.25	393.92	1.50	Unconfined
						5/12/14	30.73	31.47	0.74	398.00	-1.07	Confined
						8/4/14	26.70	32.17	5.47	397.30	-5.10	Highly Confined
						10/27/14	25.58	32.32	6.74	397.15	-6.22	Highly Confined
						3/5/15	34.25	36.87	2.62	392.60	2.45	Unconfined
						4/6/15	33.15	33.20	0.05	396.27	1.35	Unconfined
						7/20/15	18.31	32.13	13.82	397.34	-13.49	Highly Confined
						10/13/15	29.41	32.54	3.13	396.93	-2.39	Confined
						1/7/16	19.39	29.91	10.52	399.56	-12.41	Highly Confined
MP-037D	Main Sand	6	C Clay	30.50	429.04	9/4/13	29.19	29.51	0.32	399.53	-1.31	Confined
						10/1/13	30.46	31.40	0.94	397.64	-0.04	Confined
						1/14/14	32.66	33.82	1.16	395.22	2.16	Unconfined
						5/13/14	--	30.28	--	398.76	--	--
						8/4/14	25.91	30.51	4.60	398.53	-4.59	Highly Confined
						10/27/14	--	26.45	--	402.59	--	--
						3/4/15	33.45	35.60	2.15	393.44	2.95	Unconfined
						4/7/15	32.44	32.60	0.16	396.44	1.94	Unconfined
						7/20/15	18.42	28.50	10.08	400.54	-12.08	Highly Confined
						10/13/15	29.07	29.29	0.22	399.75	-1.43	Confined
						1/7/16	18.29	29.43	11.14	399.61	-12.21	Highly Confined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-038C	Main Sand	2	B Clay	24.10	426.91	9/3/13	27.40	29.30	1.90	397.61	3.30	Unconfined
						9/6/13	27.80	29.10	1.30	397.81	3.70	Unconfined
						9/9/13	28.15	29.20	1.05	397.71	4.05	Highly Unconfined
						9/13/13	28.50	29.50	1.00	397.41	4.40	Highly Unconfined
						9/16/13	28.80	29.40	0.60	397.51	4.70	Highly Unconfined
						9/23/13	29.00	29.90	0.90	397.01	4.90	Highly Unconfined
						9/27/13	29.30	29.70	0.40	397.21	5.20	Highly Unconfined
						9/30/13	29.40	29.90	0.50	397.01	5.30	Highly Unconfined
						10/3/13	29.53	30.09	0.56	396.82	5.43	Highly Unconfined
						1/17/14	31.05	33.81	2.76	393.10	6.95	Highly Unconfined
						5/16/14	--	7.86	--	419.05	--	--
						8/7/14	24.90	27.79	2.89	399.12	0.80	Unconfined
						10/30/14	24.51	26.48	1.97	400.43	0.41	Unconfined
						3/9/15	--	31.96	--	394.95	--	--
						4/6/15	30.30	33.05	2.75	393.86	6.20	Highly Unconfined
						7/21/15	14.43	25.86	11.43	401.05	-9.67	Highly Confined
						10/13/15	26.87	30.60	3.73	396.31	2.77	Unconfined
						1/5/16	15.85	20.58	4.73	406.33	-8.25	Highly Confined
MP-039C	Main Sand	2	C Clay	29.00	432.07	9/4/13	32.20	34.10	1.90	397.97	3.20	Unconfined
						9/11/13	32.50	34.70	2.20	397.37	3.50	Unconfined
						9/18/13	33.20	33.90	0.70	398.17	4.20	Highly Unconfined
						9/24/13	33.40	35.10	1.70	396.97	4.40	Highly Unconfined
						9/30/13	33.50	35.50	2.00	396.57	4.50	Highly Unconfined
						10/3/13	33.70	35.75	2.05	396.32	4.70	Highly Unconfined
						1/17/14	35.97	37.62	1.65	394.45	6.97	Highly Unconfined
						5/16/14	32.85	33.25	0.40	398.82	3.85	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-039C	Main Sand	2	C Clay	29.00	432.07	8/7/14	30.37	31.23	0.86	400.84	1.37	Unconfined
						10/30/14	29.86	30.47	0.61	401.60	0.86	Unconfined
						3/9/15	36.81	38.70	1.89	393.37	7.81	Highly Unconfined
						4/6/15	35.55	36.31	0.76	395.76	6.55	Highly Unconfined
						7/22/15	19.87	30.17	10.30	401.90	-9.13	Highly Confined
						10/13/15	32.15	33.74	1.59	398.33	3.15	Unconfined
						1/5/16	21.11	26.18	5.07	405.89	-7.89	Highly Confined
MP-042C	Main Sand	6	C Clay	31.00	430.32	9/5/13	30.20	31.00	0.80	399.32	-0.80	Confined
						9/9/13	30.50	31.30	0.80	399.02	-0.50	Confined
						9/10/13	30.71	31.06	0.35	399.26	-0.29	Confined
						9/12/13	30.80	31.20	0.40	399.12	-0.20	Confined
						9/26/13	31.50	32.00	0.50	398.32	0.50	Unconfined
						10/1/13	31.65	32.20	0.55	398.12	0.65	Unconfined
						11/14/13	32.32	32.88	0.56	397.44	1.32	Unconfined
						12/11/13	33.00	33.81	0.81	396.51	2.00	Unconfined
						1/14/14	33.80	34.67	0.87	395.65	2.80	Unconfined
						2/17/14	34.24	35.31	1.07	395.01	3.24	Unconfined
						3/20/14	33.86	34.66	0.80	395.66	2.86	Unconfined
						4/25/14	--	32.30	--	398.02	--	--
						5/13/14	--	31.45	--	398.87	--	--
						6/3/14	30.20	30.60	0.40	399.72	-0.80	Confined
						7/24/14	25.00	29.85	4.85	400.47	-6.00	Highly Confined
						8/4/14	26.62	29.74	3.12	400.58	-4.38	Highly Confined
						9/8/14	28.72	30.71	1.99	399.61	-2.28	Confined
						10/27/14	--	27.50	--	402.82	--	--
						11/20/14	--	30.73	--	399.59	--	--

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-042C	Main Sand	6	C Clay	31.00	430.32	12/23/14	31.98	32.22	0.24	398.10	0.98	Unconfined
						1/23/15	33.63	34.03	0.40	396.29	2.63	Unconfined
						2/27/15	34.55	36.10	1.55	394.22	3.55	Unconfined
						3/9/15	34.55	36.10	1.55	394.22	3.55	Unconfined
						4/6/15	33.52	33.82	0.30	396.50	2.52	Unconfined
						5/12/15	32.41	32.55	0.14	397.77	1.41	Unconfined
						6/23/15	23.51	27.23	3.72	403.09	-7.49	Highly Confined
						7/20/15	--	21.07	--	409.25	--	--
						8/24/15	27.00	27.32	0.32	403.00	-4.00	Highly Confined
						9/21/15	29.07	29.08	0.01	401.24	-1.93	Confined
						10/13/15	30.28	30.66	0.38	399.66	-0.72	Confined
						11/16/15	31.45	32.53	1.08	397.79	0.45	Unconfined
						12/14/15	--	29.19	--	401.13	--	--
						1/6/16	19.33	29.42	10.09	400.90	-11.67	Highly Confined
MP-046C	Main Sand	5	C Clay	28.70	429.60	9/6/13	29.00	31.00	2.00	398.60	0.30	Unconfined
						9/13/13	29.60	31.60	2.00	398.00	0.90	Unconfined
						9/23/13	30.00	31.90	1.90	397.70	1.30	Unconfined
						9/27/13	30.20	32.00	1.80	397.60	1.50	Unconfined
						10/1/13	30.38	32.23	1.85	397.37	1.68	Unconfined
						1/14/14	32.78	34.11	1.33	395.49	4.08	Highly Unconfined
						5/13/14	30.47	30.66	0.19	398.94	1.77	Unconfined
						8/4/14	27.17	27.17	0.00	402.43	-1.53	Confined
						10/27/14	26.12	28.03	1.91	401.57	-2.58	Confined
						3/4/15	33.65	35.83	2.18	393.77	4.95	Highly Unconfined
						4/7/15	32.40	33.15	0.75	396.45	3.70	Unconfined
						7/20/15	19.06	27.44	8.38	402.16	-9.64	Highly Confined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-046C	Main Sand	5	C Clay	28.70	429.60	10/13/15	28.87	30.96	2.09	398.64	0.17	Unconfined
						1/7/16	19.33	26.96	7.63	402.64	-9.37	Highly Confined
MP-047C	Main Sand	5	C Clay	28.50	429.01	9/6/13	28.40	29.90	1.50	399.11	-0.10	Confined
						9/13/13	29.00	30.30	1.30	398.71	0.50	Unconfined
						9/23/13	29.40	30.80	1.40	398.21	0.90	Unconfined
						9/27/13	29.60	30.40	0.80	398.61	1.10	Unconfined
						10/1/13	29.76	30.93	1.17	398.08	1.26	Unconfined
						1/14/14	31.96	33.44	1.48	395.57	3.46	Unconfined
						5/13/14	29.75	30.35	0.60	398.66	1.25	Unconfined
						8/4/14	26.49	26.51	0.02	402.50	-2.01	Confined
						10/27/14	26.11	26.13	0.02	402.88	-2.39	Confined
						3/4/15	32.96	35.09	2.13	393.92	4.46	Highly Unconfined
						4/7/15	31.72	32.33	0.61	396.68	3.22	Unconfined
						7/20/15	18.71	27.13	8.42	401.88	-9.79	Highly Confined
						10/13/15	28.28	29.80	1.52	399.21	-0.22	Confined
						1/7/16	18.51	27.91	9.40	401.10	-9.99	Highly Confined
MP-050C	Main Sand	5	C Clay	29.80	429.98	9/5/13	29.85	30.81	0.96	399.17	0.05	Unconfined
						9/9/13	30.10	31.10	1.00	398.88	0.30	Unconfined
						9/10/13	30.38	30.78	0.40	399.20	0.58	Unconfined
						10/1/13	31.32	31.97	0.65	398.01	1.52	Unconfined
						1/14/14	33.60	34.46	0.86	395.52	3.80	Unconfined
						5/13/14	--	30.91	--	399.07	--	--
						8/5/14	26.75	30.09	3.34	399.89	-3.05	Confined
						10/28/14	26.50	29.99	3.49	399.99	-3.30	Confined
						3/9/15	34.42	36.77	2.35	393.21	4.62	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-050C	Main Sand	5	C Clay	29.80	429.98	4/7/15	--	33.10	--	396.88	--	--
						7/20/15	17.95	29.94	11.99	400.04	-11.85	Highly Confined
						10/13/15	29.72	30.71	0.99	399.27	-0.08	Confined
						1/7/16	18.23	30.49	12.26	399.49	-11.57	Highly Confined
MP-053C	Main Sand	5	C Clay	29.80	430.52	9/5/13	30.03	30.61	0.58	399.91	0.23	Unconfined
						9/9/13	30.30	30.90	0.60	399.62	0.50	Unconfined
						9/10/13	30.56	30.57	0.01	399.95	0.76	Unconfined
						9/12/13	30.70	30.72	0.02	399.80	0.90	Unconfined
						9/26/13	--	31.36	--	399.16	--	--
						10/1/13	--	22.58	--	407.94	--	--
						11/14/13	--	32.31	--	398.21	--	--
						12/11/13	--	32.98	--	397.54	--	--
						1/13/14	--	33.80	--	396.72	--	--
						2/17/14	--	34.37	--	396.15	--	--
						3/20/14	--	34.12	--	396.40	--	--
						4/25/14	--	32.12	--	398.40	--	--
						5/13/14	--	31.28	--	399.24	--	--
						6/3/14	--	30.11	--	400.41	--	--
						7/24/14	25.73	26.30	0.57	404.22	-4.07	Highly Confined
						8/5/14	27.32	29.25	1.93	401.27	-2.48	Confined
						9/8/14	28.86	29.82	0.96	400.70	-0.94	Confined
						10/28/14	27.00	29.95	2.95	400.57	-2.80	Confined
						11/20/14	30.14	31.03	0.89	399.49	0.34	Unconfined
						12/23/14	31.60	31.89	0.29	398.63	1.80	Unconfined
						1/23/15	33.45	34.30	0.85	396.22	3.65	Unconfined
						2/27/15	34.65	35.50	0.85	395.02	4.85	Highly Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-053C	Main Sand	5	C Clay	29.80	430.52	3/5/15	34.86	35.80	0.94	394.72	5.06	Highly Unconfined
						4/7/15	--	33.25	--	397.27	--	--
						5/12/15	--	32.14	--	398.38	--	--
						6/23/15	--	24.49	--	406.03	--	--
						7/20/15	--	21.59	--	408.93	--	--
						8/24/15	25.69	29.94	4.25	400.58	-4.11	Highly Confined
						9/21/15	28.63	29.70	1.07	400.82	-1.17	Confined
						10/13/15	--	30.00	--	400.52	--	--
						11/16/15	--	31.47	--	399.05	--	--
						12/14/15	28.81	29.17	0.36	401.35	-0.99	Confined
						1/7/16	19.39	28.66	9.27	401.86	-10.41	Highly Confined
MP-055C	Main Sand	5	C Clay	28.90	429.67	9/6/13	28.30	31.90	3.60	397.77	-0.60	Confined
						9/9/13	28.52	32.22	3.70	397.45	-0.38	Confined
						9/10/13	28.60	32.50	3.90	397.17	-0.30	Confined
						9/13/13	28.90	32.40	3.50	397.27	0.00	Confined
						9/16/13	29.15	32.60	3.45	397.07	0.25	Unconfined
						9/17/13	29.50	31.50	2.00	398.17	0.60	Unconfined
						9/23/13	29.45	32.70	3.25	396.97	0.55	Unconfined
						9/23/13	29.50	32.60	3.10	397.07	0.60	Unconfined
						9/27/13	29.65	32.05	2.40	397.62	0.75	Unconfined
						9/30/13	29.90	32.13	2.23	397.54	1.00	Unconfined
						10/1/13	30.07	31.70	1.63	397.97	1.17	Unconfined
						10/7/13	30.17	33.15	2.98	396.52	1.27	Unconfined
						10/14/13	30.31	33.22	2.91	396.45	1.41	Unconfined
						10/21/13	30.50	33.59	3.09	396.08	1.60	Unconfined
						10/28/13	30.68	33.45	2.77	396.22	1.78	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-055C	Main Sand	5	C Clay	28.90	429.67	11/4/13	30.65	31.78	1.13	397.89	1.75	Unconfined
						11/11/13	30.81	33.06	2.25	396.61	1.91	Unconfined
						11/14/13	30.76	32.72	1.96	396.95	1.86	Unconfined
						11/18/13	31.06	32.99	1.93	396.68	2.16	Unconfined
						11/25/13	31.06	32.24	1.18	397.43	2.16	Unconfined
						12/2/13	31.07	32.88	1.81	396.79	2.17	Unconfined
						12/9/13	31.42	33.33	1.91	396.34	2.52	Unconfined
						12/11/13	31.43	33.15	1.72	396.52	2.53	Unconfined
						12/17/13	31.71	33.62	1.91	396.05	2.81	Unconfined
						12/24/13	32.00	33.80	1.80	395.87	3.10	Unconfined
						12/31/13	32.15	33.63	1.48	396.04	3.25	Unconfined
						1/10/14	32.20	33.78	1.58	395.89	3.30	Unconfined
						1/13/14	32.26	33.92	1.66	395.75	3.36	Unconfined
						1/23/14	32.69	33.61	0.92	396.06	3.79	Unconfined
						1/30/14	32.61	33.41	0.80	396.26	3.71	Unconfined
						2/17/14	–	33.06	–	396.61	–	–
						2/20/14	33.04	33.65	0.61	396.02	4.14	Highly Unconfined
						2/28/14	32.65	32.76	0.11	396.91	3.75	Unconfined
						3/7/14	32.56	32.93	0.37	396.74	3.66	Unconfined
						3/10/14	33.33	34.11	0.78	395.56	4.43	Highly Unconfined
						3/11/14	33.37	34.22	0.85	395.45	4.47	Highly Unconfined
						3/13/14	33.61	34.58	0.97	395.09	4.71	Highly Unconfined
						3/17/14	33.48	34.03	0.55	395.64	4.58	Highly Unconfined
						3/19/14	33.40	33.96	0.56	395.71	4.50	Highly Unconfined
						3/20/14	33.37	33.85	0.48	395.82	4.47	Highly Unconfined
						3/21/14	33.33	33.72	0.39	395.95	4.43	Highly Unconfined
						3/24/14	33.42	33.77	0.35	395.90	4.52	Highly Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-055C	Main Sand	5	C Clay	28.90	429.67	3/26/14	--	33.37	--	396.30	--	--
						3/28/14	33.27	33.83	0.56	395.84	4.37	Highly Unconfined
						3/31/14	33.13	33.56	0.43	396.11	4.23	Highly Unconfined
						4/4/14	32.45	32.46	0.01	397.21	3.55	Unconfined
						4/10/14	--	31.59	--	398.08	--	--
						4/14/14	31.46	32.15	0.69	397.52	2.56	Unconfined
						4/21/14	31.19	31.63	0.44	398.04	2.29	Unconfined
						4/25/14	31.15	31.40	0.25	398.27	2.25	Unconfined
						4/28/14	--	30.92	--	398.75	--	--
						5/5/14	--	30.60	--	399.07	--	--
						5/12/14	--	30.34	--	399.33	--	--
						5/12/14	--	30.34	--	399.33	--	--
						5/20/14	--	29.76	--	399.91	--	--
						5/27/14	--	29.48	--	400.19	--	--
						6/2/14	--	29.27	--	400.40	--	--
						6/3/14	--	29.49	--	400.18	--	--
						6/12/14	--	28.47	--	401.20	--	--
						6/17/14	--	28.15	--	401.52	--	--
						6/23/14	--	27.95	--	401.72	--	--
						7/11/14	25.36	25.37	0.01	404.30	-3.54	Confined
						7/14/14	24.69	24.70	0.01	404.97	-4.21	Highly Confined
						7/24/14	--	25.06	--	404.61	--	--
						7/28/14	25.61	25.63	0.02	404.04	-3.29	Confined
						8/5/14	26.56	29.93	3.37	399.74	-2.34	Confined
						8/12/14	27.22	29.26	2.04	400.41	-1.68	Confined
						8/18/14	27.56	30.15	2.59	399.52	-1.34	Confined
						8/25/14	27.98	31.00	3.02	398.67	-0.92	Confined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-055C	Main Sand	5	C Clay	28.90	429.67	9/2/14	28.30	30.62	2.32	399.05	-0.60	Confined
						9/8/14	28.08	28.68	0.60	400.99	-0.82	Confined
						9/23/14	26.67	26.98	0.31	402.69	-2.23	Confined
						9/30/14	26.73	29.36	2.63	400.31	-2.17	Confined
						10/16/14	26.32	27.81	1.49	401.86	-2.58	Confined
						10/28/14	26.26	29.11	2.85	400.56	-2.64	Confined
						11/7/14	27.38	30.55	3.17	399.12	-1.52	Confined
						11/11/14	27.73	31.67	3.94	398.00	-1.17	Confined
						11/20/14	28.40	32.40	4.00	397.27	-0.50	Confined
						11/28/14	29.00	32.85	3.85	396.82	0.10	Unconfined
						12/4/14	29.22	31.82	2.60	397.85	0.32	Unconfined
						12/11/14	29.45	32.93	3.48	396.74	0.55	Unconfined
						12/18/14	29.71	33.57	3.86	396.10	0.81	Unconfined
						12/23/14	29.81	33.52	3.71	396.15	0.91	Unconfined
						12/24/14	29.87	33.49	3.62	396.18	0.97	Unconfined
						12/29/14	30.17	33.35	3.18	396.32	1.27	Unconfined
						1/9/15	31.77	32.16	0.39	397.51	2.87	Unconfined
						1/13/15	31.60	35.31	3.71	394.36	2.70	Unconfined
						1/19/15	32.30	34.11	1.81	395.56	3.40	Unconfined
						1/22/15	32.72	33.92	1.20	395.75	3.82	Unconfined
						1/23/15	32.53	33.82	1.29	395.85	3.63	Unconfined
						1/30/15	33.17	33.66	0.49	396.01	4.27	Highly Unconfined
						2/3/15	33.22	33.63	0.41	396.04	4.32	Highly Unconfined
						2/10/15	33.40	33.50	0.10	396.17	4.50	Highly Unconfined
						2/20/15	33.61	33.90	0.29	395.77	4.71	Highly Unconfined
						2/25/15	33.37	34.00	0.63	395.67	4.47	Highly Unconfined
						2/27/15	33.95	34.45	0.50	395.22	5.05	Highly Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-055C	Main Sand	5	C Clay	28.90	429.67	3/2/15	34.00	34.58	0.58	395.09	5.10	Highly Unconfined
						3/5/15	33.95	34.45	0.50	395.22	5.05	Highly Unconfined
						3/10/15	34.14	34.16	0.02	395.51	5.24	Highly Unconfined
						3/11/15	--	33.50	--	396.17	--	--
						3/17/15	--	33.10	--	396.57	--	--
						3/23/15	--	32.60	--	397.07	--	--
						3/30/15	--	32.38	--	397.29	--	--
						4/7/15	--	32.06	--	397.61	--	--
						5/12/15	30.85	32.28	1.43	397.39	1.95	Unconfined
						6/23/15	24.21	24.22	0.01	405.45	-4.69	Highly Confined
						7/20/15	19.73	27.32	7.59	402.35	-9.17	Highly Confined
						8/24/15	25.19	28.83	3.64	400.84	-3.71	Confined
						9/21/15	27.26	29.76	2.50	399.91	-1.64	Confined
						10/13/15	28.33	31.82	3.49	397.85	-0.57	Confined
						11/16/15	29.90	32.21	2.31	397.46	1.00	Unconfined
						12/14/15	--	27.96	--	401.71	--	--
						1/7/16	18.33	31.93	13.60	397.74	-10.57	Highly Confined
MP-078D	Main Sand	1	C Clay	28.60	430.17	10/3/13	--	33.95	--	396.22	--	--
						11/14/13	--	34.22	--	395.95	--	--
						12/11/13	35.15	35.20	0.05	394.97	6.55	Highly Unconfined
						1/17/14	--	35.87	--	394.30	--	--
						2/17/14	--	36.29	--	393.88	--	--
						3/20/14	34.84	34.90	0.06	395.27	6.24	Highly Unconfined
						4/25/14	33.22	33.51	0.29	396.66	4.62	Highly Unconfined
						5/16/14	--	31.89	--	398.28	--	--
						6/3/14	--	31.01	--	399.16	--	--

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-078D	Main Sand	1	C Clay	28.60	430.17	7/24/14	--	26.77	--	403.40	--	--
						8/7/14	30.04	30.56	0.52	399.61	1.44	Unconfined
						9/8/14	--	29.98	--	400.19	--	--
						10/31/14	29.78	29.97	0.19	400.20	1.18	Unconfined
						11/20/14	32.58	33.62	1.04	396.55	3.98	Unconfined
						12/23/14	34.00	35.13	1.13	395.04	5.40	Highly Unconfined
						1/23/15	35.48	36.51	1.03	393.66	6.88	Highly Unconfined
						2/26/15	36.40	37.11	0.71	393.06	7.80	Highly Unconfined
						3/6/15	36.40	37.11	0.71	393.06	7.80	Highly Unconfined
						4/6/15	35.13	35.60	0.47	394.57	6.53	Highly Unconfined
						5/12/15	33.66	33.81	0.15	396.36	5.06	Highly Unconfined
						6/23/15	21.29	24.61	3.32	405.56	-7.31	Highly Confined
						7/21/15	18.73	23.57	4.84	406.60	-9.87	Highly Confined
						8/24/15	28.07	32.18	4.11	397.99	-0.53	Confined
						9/21/15	30.10	32.25	2.15	397.92	1.50	Unconfined
						11/16/15	33.20	34.57	1.37	395.60	4.60	Highly Unconfined
						12/14/15	--	30.30	--	399.87	--	--
						1/5/16	21.17	22.00	0.83	408.17	-7.43	Highly Confined
MP-079C	Main Sand	1	C Clay	36.00	429.52	9/3/13	28.60	37.00	8.40	392.52	-7.40	Highly Confined
						9/10/13	29.30	37.10	7.80	392.42	-6.70	Highly Confined
						9/17/13	30.00	37.00	7.00	392.52	-6.00	Highly Confined
						9/24/13	30.18	36.90	6.72	392.62	-5.82	Highly Confined
						9/30/13	30.60	37.00	6.40	392.52	-5.40	Highly Confined
						10/3/13	30.80	36.84	6.04	392.68	-5.20	Highly Confined
						1/17/14	35.95	36.88	0.93	392.64	-0.05	Confined
						5/16/14	28.90	36.60	7.70	392.92	-7.10	Highly Confined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-079C	Main Sand	1	C Clay	36.00	429.52	8/7/14	26.17	37.00	10.83	392.52	-9.83	Highly Confined
						10/31/14	25.58	37.03	11.45	392.49	-10.42	Highly Confined
						3/6/15	35.21	36.95	1.74	392.57	-0.79	Confined
						4/6/15	32.96	37.06	4.10	392.46	-3.04	Confined
						7/21/15	15.51	35.02	19.51	394.50	-20.49	Highly Confined
						10/12/15	28.45	37.00	8.55	392.52	-7.55	Highly Confined
						1/5/16	15.21	35.43	20.22	394.09	-20.79	Highly Confined
MP-080C	Main Sand	1	C Clay	33.90	430.03	9/6/13	30.80	32.50	1.70	397.53	-3.10	Confined
						10/3/13	--	32.62	--	397.41	--	--
						11/14/13	32.93	33.67	0.74	396.36	-0.97	Confined
						12/11/13	33.93	34.36	0.43	395.67	0.03	Unconfined
						1/17/14	34.68	35.27	0.59	394.76	0.78	Unconfined
						2/17/14	35.15	35.80	0.65	394.23	1.25	Unconfined
						3/20/14	34.15	34.42	0.27	395.61	0.25	Unconfined
						4/25/14	31.61	34.90	3.29	395.13	-2.29	Confined
						5/16/14	--	31.05	--	398.98	--	--
						6/3/14	--	29.96	--	400.07	--	--
						7/24/14	24.71	30.38	5.67	399.65	-9.19	Highly Confined
						8/7/14	27.70	33.32	5.62	396.71	-6.20	Highly Confined
						9/8/14	27.62	33.78	6.16	396.25	-6.28	Highly Confined
						10/31/14	--	27.78	--	402.25	--	--
						11/20/14	30.50	34.38	3.88	395.65	-3.40	Confined
						12/23/14	32.06	35.50	3.44	394.53	-1.84	Confined
						1/23/15	33.57	36.90	3.33	393.13	-0.33	Confined
						2/27/15	34.60	38.21	3.61	391.82	0.70	Unconfined
						3/6/15	34.60	38.21	3.61	391.82	0.70	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-080C	Main Sand	1	C Clay	33.90	430.03	4/6/15	33.34	36.67	3.33	393.36	-0.56	Confined
						5/12/15	31.67	36.05	4.38	393.98	-2.23	Confined
						6/23/15	20.25	30.14	9.89	399.89	-13.65	Highly Confined
						7/21/15	18.37	29.33	10.96	400.70	-15.53	Highly Confined
						8/24/15	24.63	33.67	9.04	396.36	-9.27	Highly Confined
						9/21/15	27.24	36.87	9.63	393.16	-6.66	Highly Confined
						10/12/15	28.58	37.22	8.64	392.81	-5.32	Highly Confined
						11/16/15	--	32.20	--	397.83	--	--
						12/14/15	28.98	29.04	0.06	400.99	-4.92	Highly Confined
						1/5/16	19.82	24.82	5.00	405.21	-14.08	Highly Confined
MP-136	Main Sand	5	C Clay	28.00	429.41	9/3/13	28.29	29.62	1.33	399.79	0.29	Unconfined
						9/9/13	28.72	29.75	1.03	399.66	0.72	Unconfined
						9/16/13	29.40	29.85	0.45	399.56	1.40	Unconfined
						9/23/13	29.71	30.05	0.34	399.36	1.71	Unconfined
						9/30/13	29.68	30.00	0.32	399.41	1.68	Unconfined
						10/7/13	30.08	30.47	0.39	398.94	2.08	Unconfined
						10/14/13	30.26	30.52	0.26	398.89	2.26	Unconfined
						10/21/13	30.45	30.54	0.09	398.87	2.45	Unconfined
						10/28/13	30.67	30.84	0.17	398.57	2.67	Unconfined
						11/4/13	--	30.18	--	399.23	--	--
						11/11/13	30.66	30.77	0.11	398.64	2.66	Unconfined
						11/18/13	30.80	30.90	0.10	398.51	2.80	Unconfined
						11/25/13	--	30.68	--	398.73	--	--
						12/2/13	30.79	30.88	0.09	398.53	2.79	Unconfined
						12/9/13	31.20	31.20	0.00	398.21	3.20	Unconfined
						12/17/13	31.40	31.53	0.13	397.88	3.40	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-136	Main Sand	5	C Clay	28.00	429.41	12/24/13	31.67	31.80	0.13	397.61	3.67	Unconfined
						12/31/13	31.78	31.86	0.08	397.55	3.78	Unconfined
						1/10/14	--	31.91	--	397.50	--	--
						1/13/14	--	30.98	--	398.43	--	--
						1/23/14	--	32.22	--	397.19	--	--
						1/30/14	--	32.10	--	397.31	--	--
						2/18/14	--	32.72	--	396.69	--	--
						2/28/14	--	32.52	--	396.89	--	--
						3/7/14	--	32.00	--	397.41	--	--
						3/10/14	--	33.17	--	396.24	--	--
						3/11/14	--	33.23	--	396.18	--	--
						3/13/14	--	33.49	--	395.92	--	--
						3/17/14	--	33.29	--	396.12	--	--
						3/19/14	--	33.23	--	396.18	--	--
						3/21/14	--	33.11	--	396.30	--	--
						3/24/14	--	33.17	--	396.24	--	--
						3/26/14	--	33.17	--	396.24	--	--
						3/28/14	--	33.10	--	396.31	--	--
						3/31/14	--	32.89	--	396.52	--	--
						4/4/14	--	31.88	--	397.53	--	--
						4/10/14	--	31.08	--	398.33	--	--
						4/14/14	--	31.05	--	398.36	--	--
						4/21/14	--	30.72	--	398.69	--	--
						4/28/14	--	30.35	--	399.06	--	--
						5/5/14	--	30.05	--	399.36	--	--
						5/12/14	--	29.76	--	399.65	--	--
						5/12/14	--	29.79	--	399.62	--	--

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-136	Main Sand	5	C Clay	28.00	429.41	5/20/14	--	29.22	--	400.19	--	--
						5/27/14	--	28.95	--	400.46	--	--
						6/2/14	28.68	28.97	0.29	400.44	0.68	Unconfined
						6/12/14	--	28.70	--	400.71	--	--
						6/17/14	27.37	29.03	1.66	400.38	-0.63	Confined
						6/23/14	27.07	29.07	2.00	400.34	-0.93	Confined
						7/11/14	24.12	28.79	4.67	400.62	-3.88	Confined
						7/14/14	23.30	28.98	5.68	400.43	-4.70	Highly Confined
						7/28/14	24.17	29.08	4.91	400.33	-3.83	Confined
						8/5/14	25.85	29.41	3.56	400.00	-2.15	Confined
						8/12/14	26.54	29.21	2.67	400.20	-1.46	Confined
						8/18/14	27.12	29.20	2.08	400.21	-0.88	Confined
						8/25/14	27.77	29.23	1.46	400.18	-0.23	Confined
						9/2/14	28.02	29.11	1.09	400.30	0.02	Unconfined
						9/23/14	25.60	29.03	3.43	400.38	-2.40	Confined
						9/30/14	26.11	29.28	3.17	400.13	-1.89	Confined
						10/16/14	25.40	28.92	3.52	400.49	-2.60	Confined
						10/28/14	25.68	29.15	3.47	400.26	-2.32	Confined
						11/7/14	26.83	29.28	2.45	400.13	-1.17	Confined
						11/11/14	27.58	29.32	1.74	400.09	-0.42	Confined
						11/28/14	29.02	29.18	0.16	400.23	1.02	Unconfined
						12/4/14	28.72	29.23	0.51	400.18	0.72	Unconfined
						12/11/14	29.44	29.70	0.26	399.71	1.44	Unconfined
						12/18/14	29.75	30.05	0.30	399.36	1.75	Unconfined
						12/24/14	29.83	30.16	0.33	399.25	1.83	Unconfined
						12/29/14	30.05	30.49	0.44	398.92	2.05	Unconfined
						1/9/15	30.62	30.82	0.20	398.59	2.62	Unconfined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
MP-136	Main Sand	5	C Clay	28.00	429.41	1/13/15	31.80	32.14	0.34	397.27	3.80	Unconfined
						1/19/15	32.19	32.49	0.30	396.92	4.19	Highly Unconfined
						1/22/15	32.51	32.72	0.21	396.69	4.51	Highly Unconfined
						1/30/15	32.84	32.94	0.10	396.47	4.84	Highly Unconfined
						2/3/15	--	32.86	--	396.55	--	--
						2/10/15	--	32.98	--	396.43	--	--
						2/20/15	--	33.24	--	396.17	--	--
						2/25/15	--	33.35	--	396.06	--	--
						3/2/15	--	33.67	--	395.74	--	--
						3/9/15	--	33.35	--	396.06	--	--
						3/10/15	--	33.80	--	395.61	--	--
						3/11/15	--	32.79	--	396.62	--	--
						3/17/15	--	32.45	--	396.96	--	--
						3/23/15	--	31.92	--	397.49	--	--
						3/30/15	--	31.72	--	397.69	--	--
						4/7/15	--	31.50	--	397.91	--	--
						7/20/15	--	20.56	--	408.85	--	--
						10/14/15	28.32	29.20	0.88	400.21	0.32	Unconfined
						1/7/16	19.05	28.31	9.26	401.10	-8.95	Highly Confined
RW-004A	Multiple Strata	6	C Clay	34.00	429.86	9/4/13	29.70	32.60	2.90	397.26	-4.30	Highly Confined
						9/11/13	30.40	32.60	2.20	397.26	-3.60	Confined
						9/24/13	31.10	32.70	1.60	397.16	-2.90	Confined
						9/30/13	31.40	32.70	1.30	397.16	-2.60	Confined
						10/1/13	31.56	32.81	1.25	397.05	-2.44	Confined
						1/13/14	33.72	34.90	1.18	394.96	-0.28	Confined
						5/13/14	31.00	31.95	0.95	397.91	-3.00	Confined

TABLE 8. FLUID LEVEL MEASUREMENTS FOR WELLS WITH GREATER THAN 4-FEET OF APPARENT LNAPL THICKNESS, MAIN SAND STRATUM HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

Monitoring Location	Hydrostratigraphic Unit	Effectiveness Zone	Confining Unit	Depth to Bottom of Confining Unit (ft-bgs)	Measuring Point Elevation (ft-amsl)	Date	Depth to LNAPL (ft-bmp)	Depth to Water (ft-bmp)	LNAPL Thickness (feet)	Groundwater Elevation (ft-amsl)	LNAPL Depth Below Confining Contact (ft)	LNAPL Condition
RW-004A	Multiple Strata	6	C Clay	34.00	429.86	8/4/14	27.03	31.99	4.96	397.87	-6.97	Highly Confined
						10/27/14	25.98	32.00	6.02	397.86	-8.02	Highly Confined
						3/9/15	--	34.48	--	395.38	--	--
						4/7/15	33.47	33.86	0.39	396.00	-0.53	Confined
						7/20/15	20.64	24.95	4.31	404.91	-13.36	Highly Confined
						10/13/15	29.83	32.30	2.47	397.56	-4.17	Highly Confined
						1/6/16	20.40	25.74	5.34	404.12	-13.60	Highly Confined
RW-005	Multiple Strata	6	C Clay	31.00	430.22	9/4/13	29.95	30.24	0.29	399.98	-1.05	Confined
						9/11/13	30.50	30.70	0.20	399.52	-0.50	Confined
						9/24/13	31.10	31.40	0.30	398.82	0.10	Unconfined
						9/30/13	31.30	31.60	0.30	398.62	0.30	Unconfined
						10/1/13	31.38	31.71	0.33	398.51	0.38	Unconfined
						1/14/14	33.50	34.22	0.72	396.00	2.50	Unconfined
						5/13/14	31.18	31.28	0.10	398.94	0.18	Unconfined
						8/4/14	27.18	30.10	2.92	400.12	-3.82	Confined
						10/28/14	26.87	30.17	3.30	400.05	-4.13	Highly Confined
						3/6/15	34.28	35.48	1.20	394.74	3.28	Unconfined
						4/6/15	33.20	33.45	0.25	396.77	2.20	Unconfined
						7/20/15	19.12	30.45	11.33	399.77	-11.88	Highly Confined
						10/13/15	29.91	30.59	0.68	399.63	-1.09	Confined
						1/6/16	18.81	30.68	11.87	399.54	-12.19	Highly Confined

Notes:

ft-bgs - feet below ground surface

ft-amsl - feet above mean sea level

ft-bmp - feet below measuring point

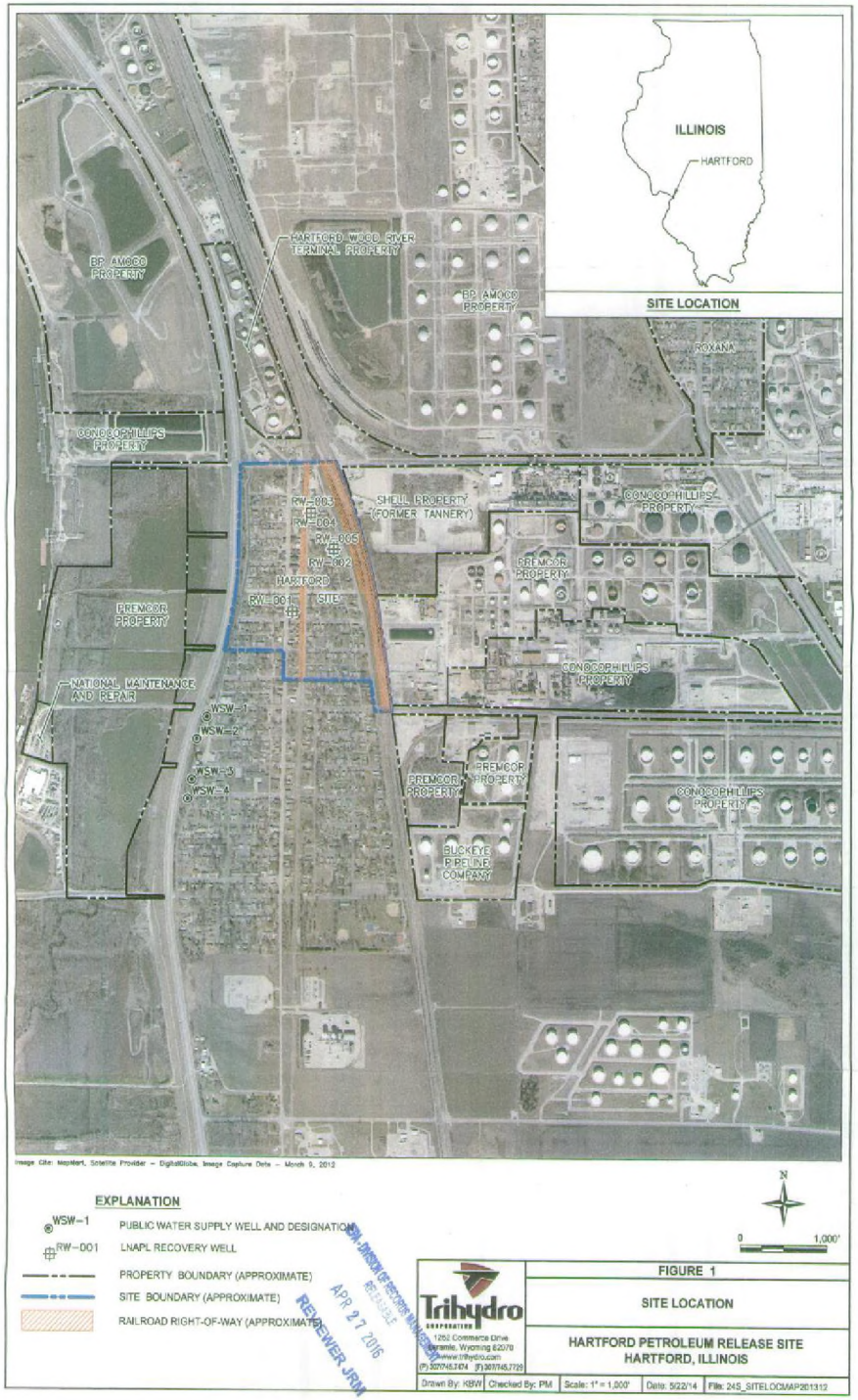
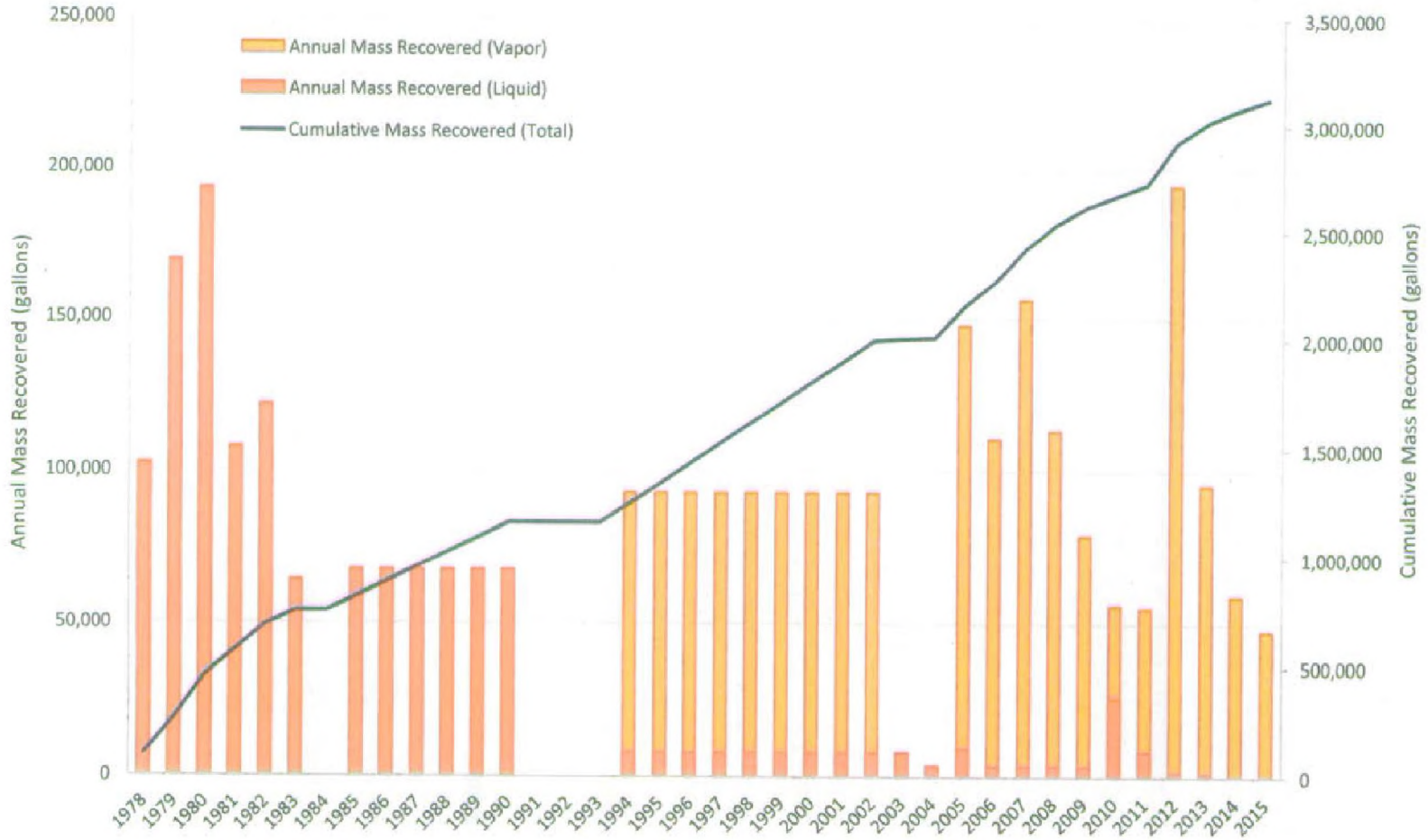
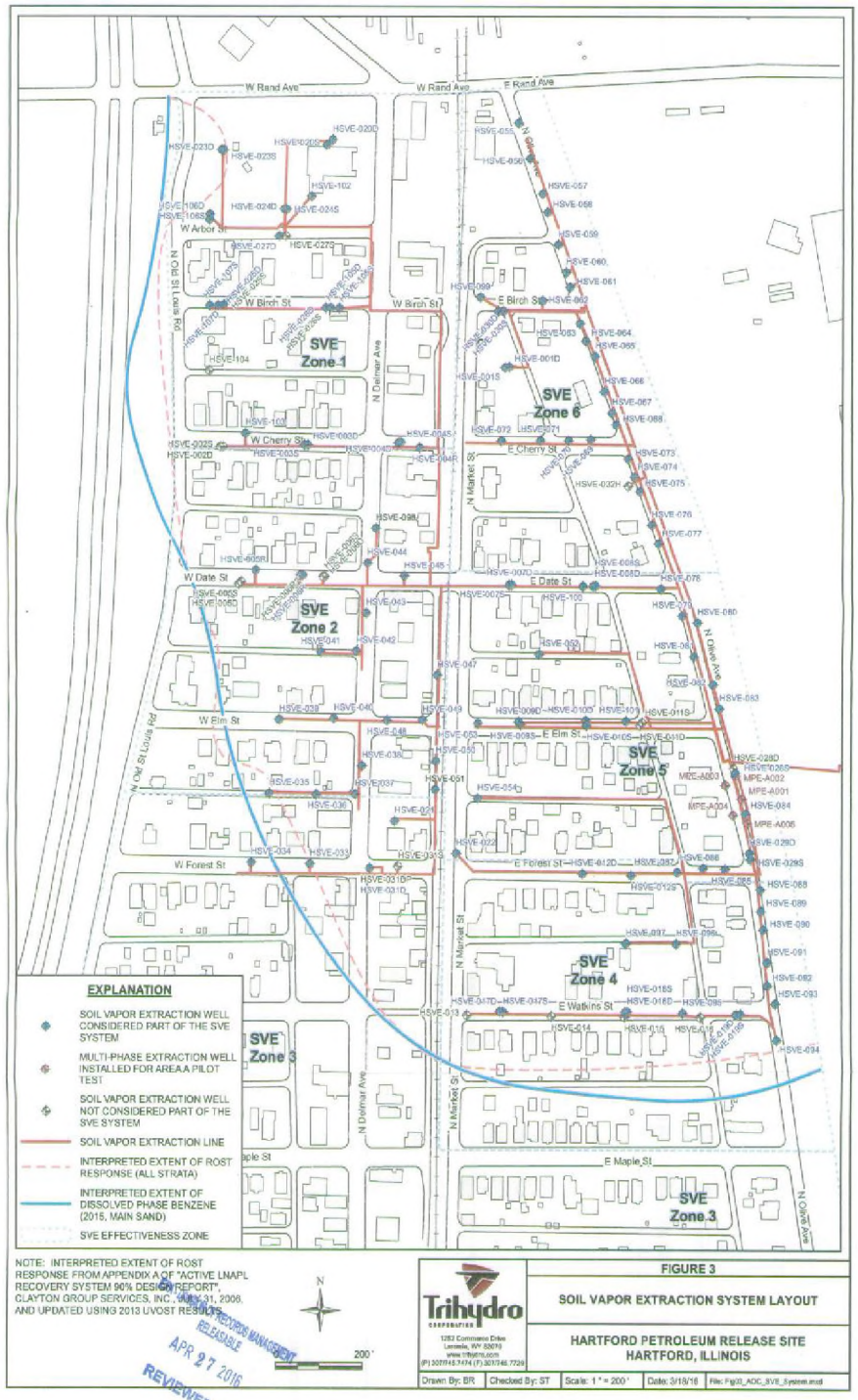
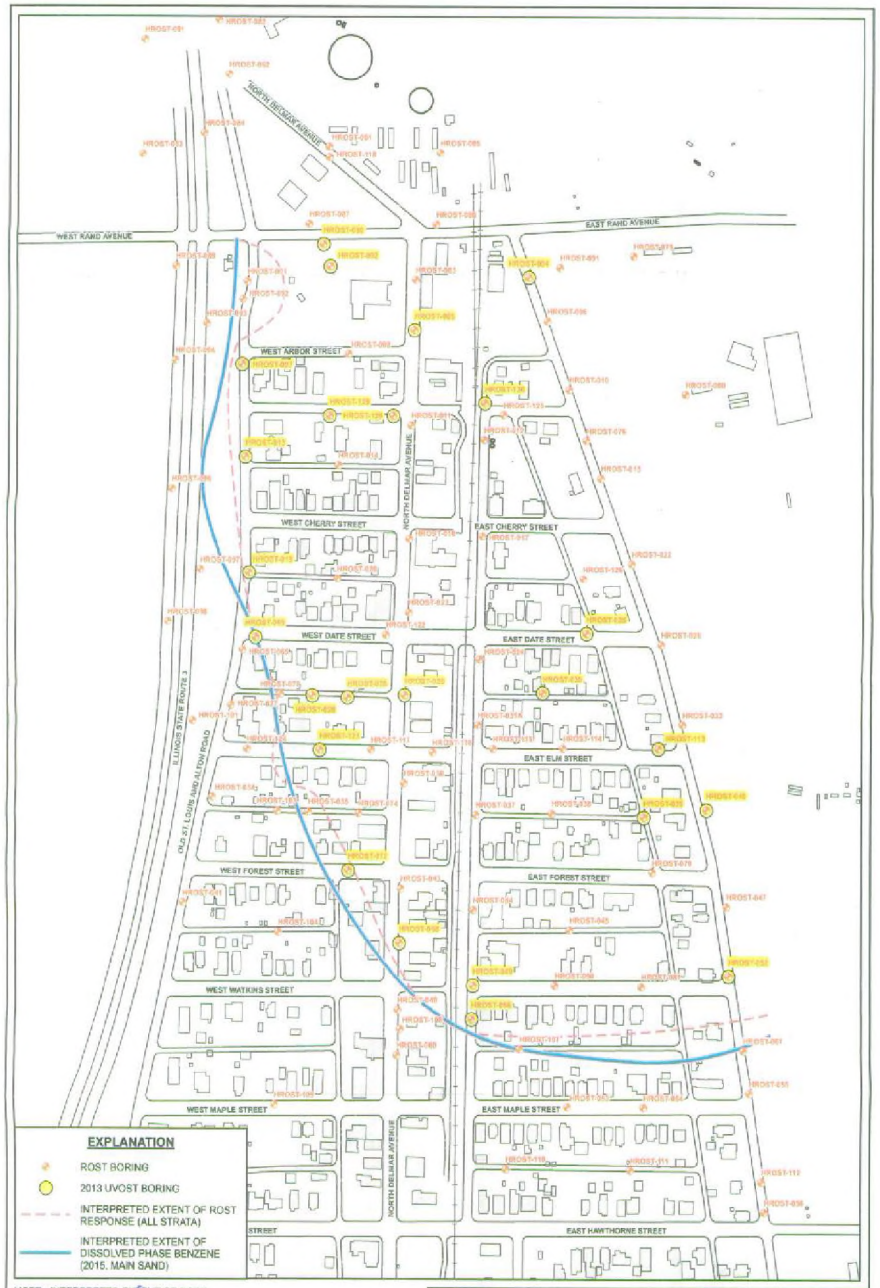


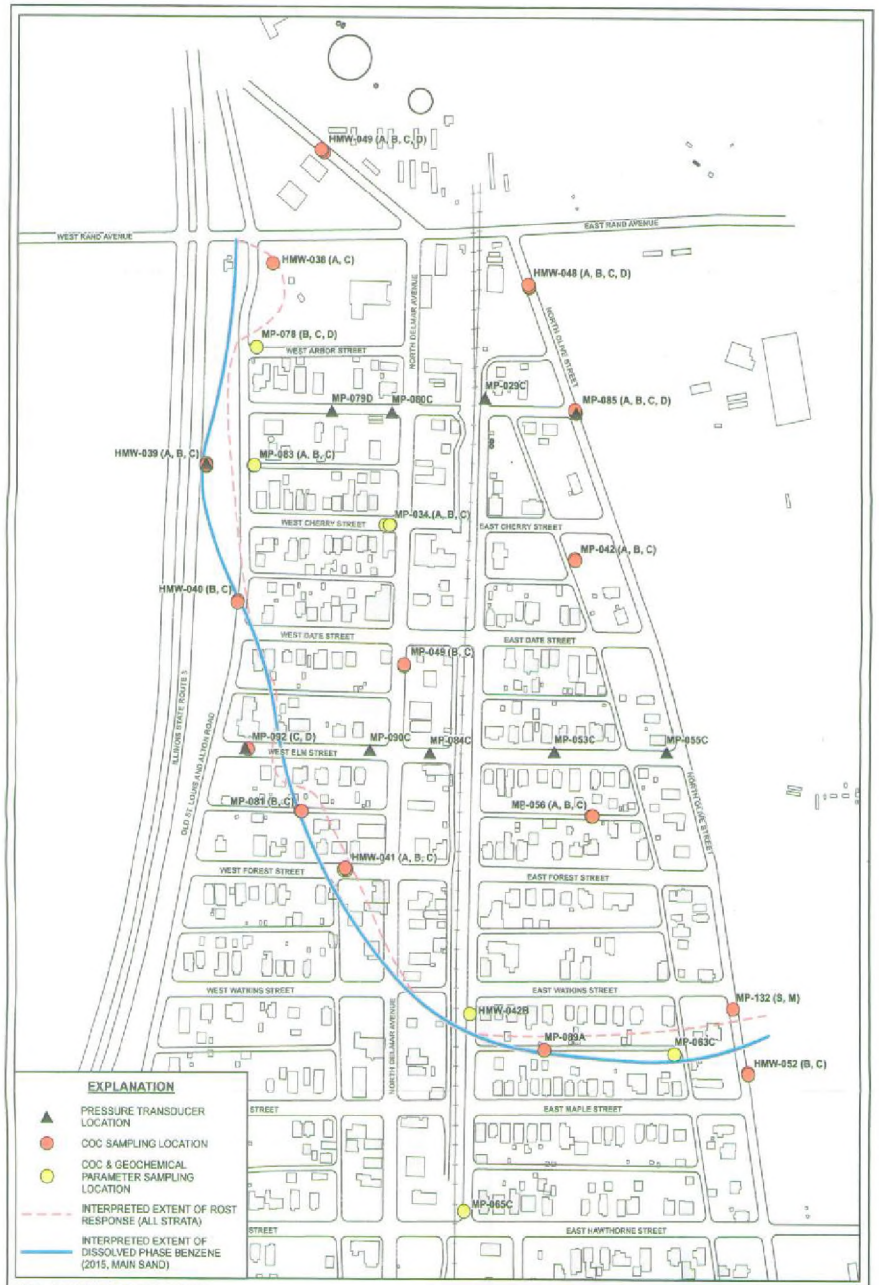
FIGURE 2. TOTAL PETROLEUM HYDROCARBONS RECOVERED SINCE 1978
HARTFORD PETROLEUM RELEASE SITE, HARTFORD, ILLINOIS

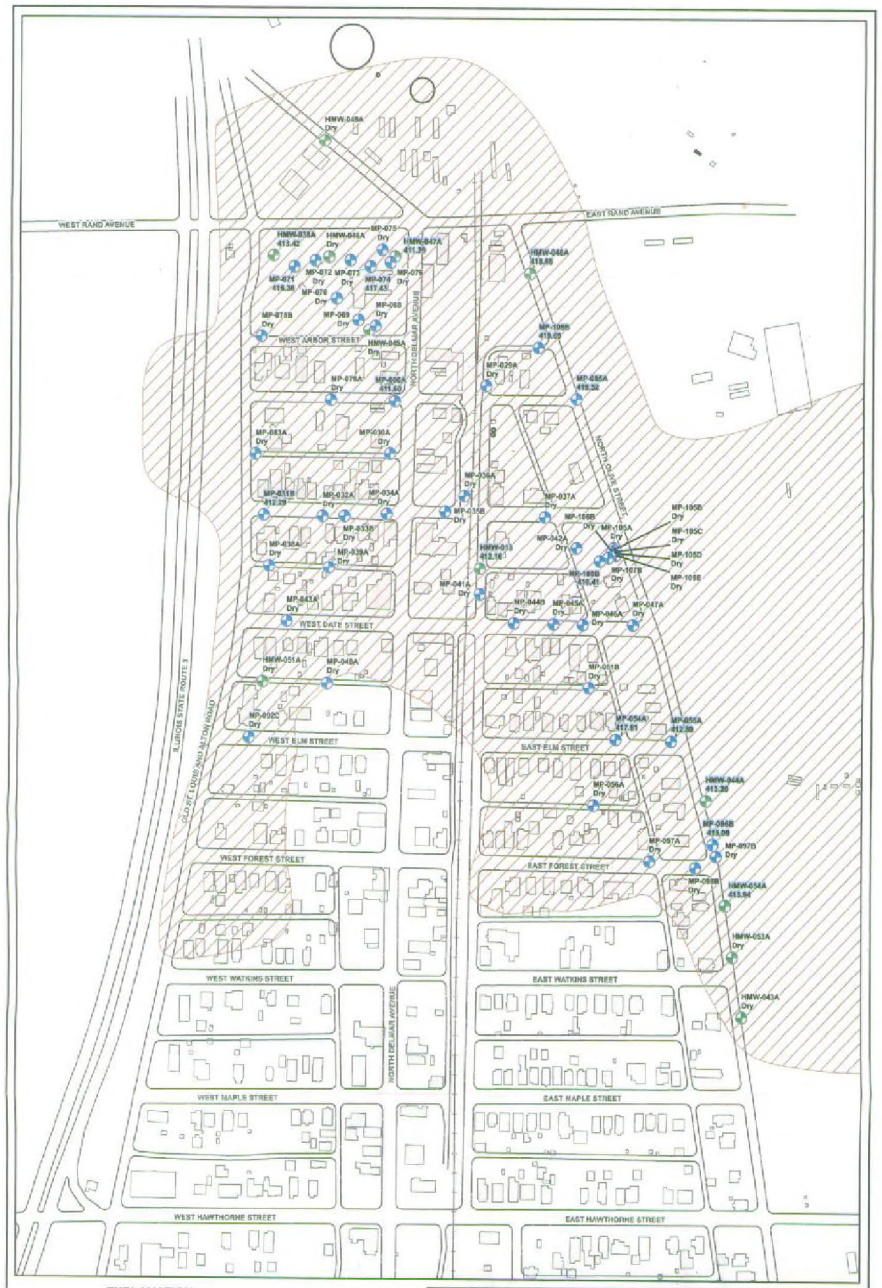


201511_HistoricalLNAPLRecovery









EXPLANATION

- GROUNDWATER MONITORING WELL
- MULTIPURPOSE MONITORING POINT
- NORTH OLIVE HYDROSTRATIGRAPHIC UNIT
- TANK
- BUILDING

N

0 250'

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Laramie, WY 82070
www.trihydro.com
(P) 307/745-7474 (F) 307/745-7729

FIGURE 6
GROUNDWATER ELEVATIONS
NORTH OLIVE STRATUM
SECOND QUARTER 2014 (HIGH WATER TABLE)

HARTFORD PETROLEUM RELEASE SITE
HARTFORD, ILLINOIS

Drawn By: BR	Checked By: TA	Scale: 1" = 250'	Date: 3/18/16	File: Fig06_AOC_NOliveWet.mxd

ILLINOIS EMERGENCY MANAGEMENT AGENCY
RELEASE
APR 27 2016
REVIEWER JRM

EXPLANATION

- GROUNDWATER MONITORING WELL
- MULTIPURPOSE MONITORING POINT
- NORTH OLIVE HYDROSTRATIGRAPHIC UNIT
- TANK
- BUILDING

N

250'

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FIGURE 7
GROUNDWATER ELEVATIONS
NORTH OLIVE STRATUM
FOURTH QUARTER 2013 (LOW WATER TABLE)

HARTFORD PETROLEUM RELEASE SITE
HARTFORD, ILLINOIS

Drawn By: BR	Checked By: TA	Scale: 1" = 250'	Date: 3/18/16	File: Fig07_AOC_4Q13_NOliveDry.mxd

APR 27 2016

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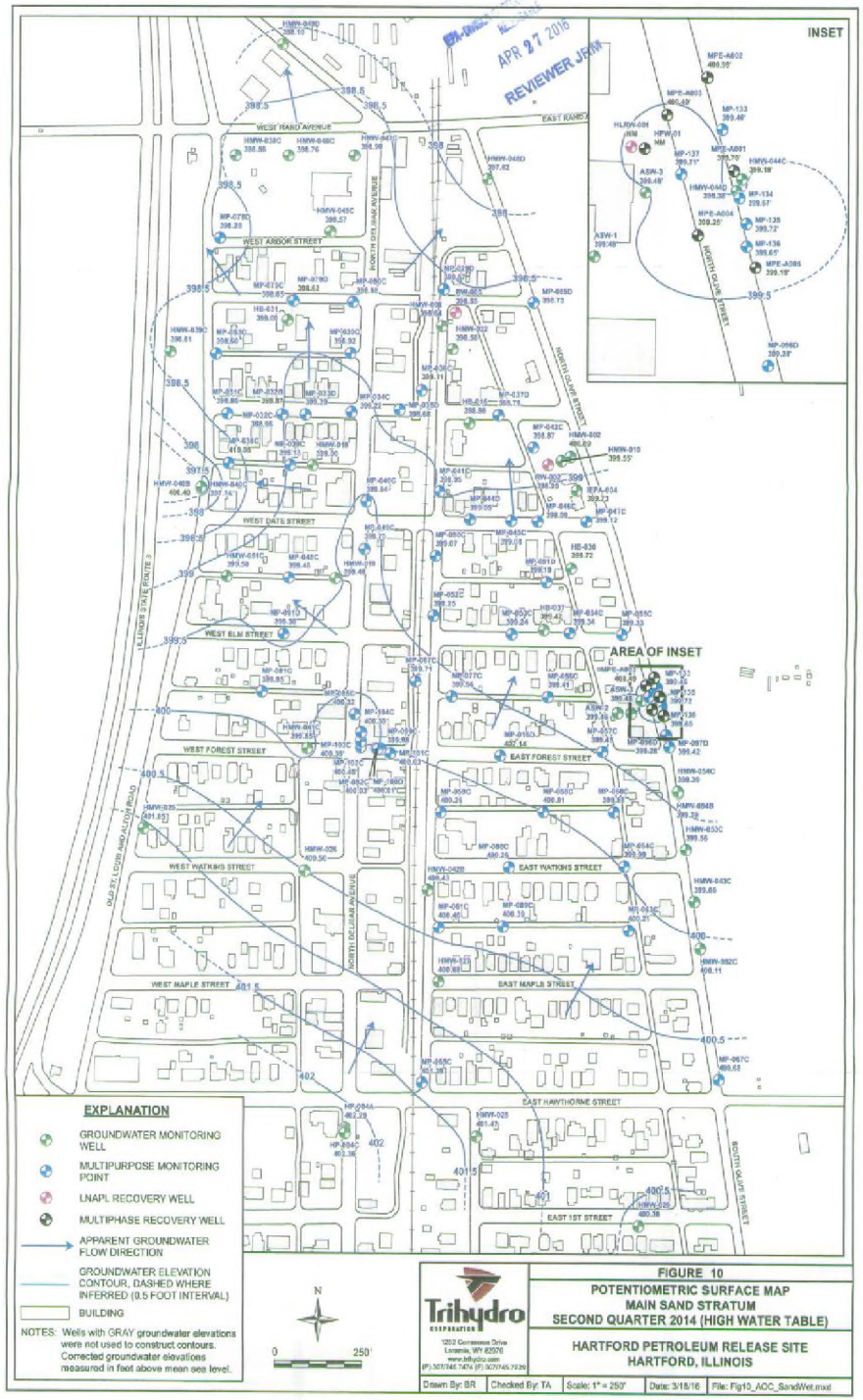

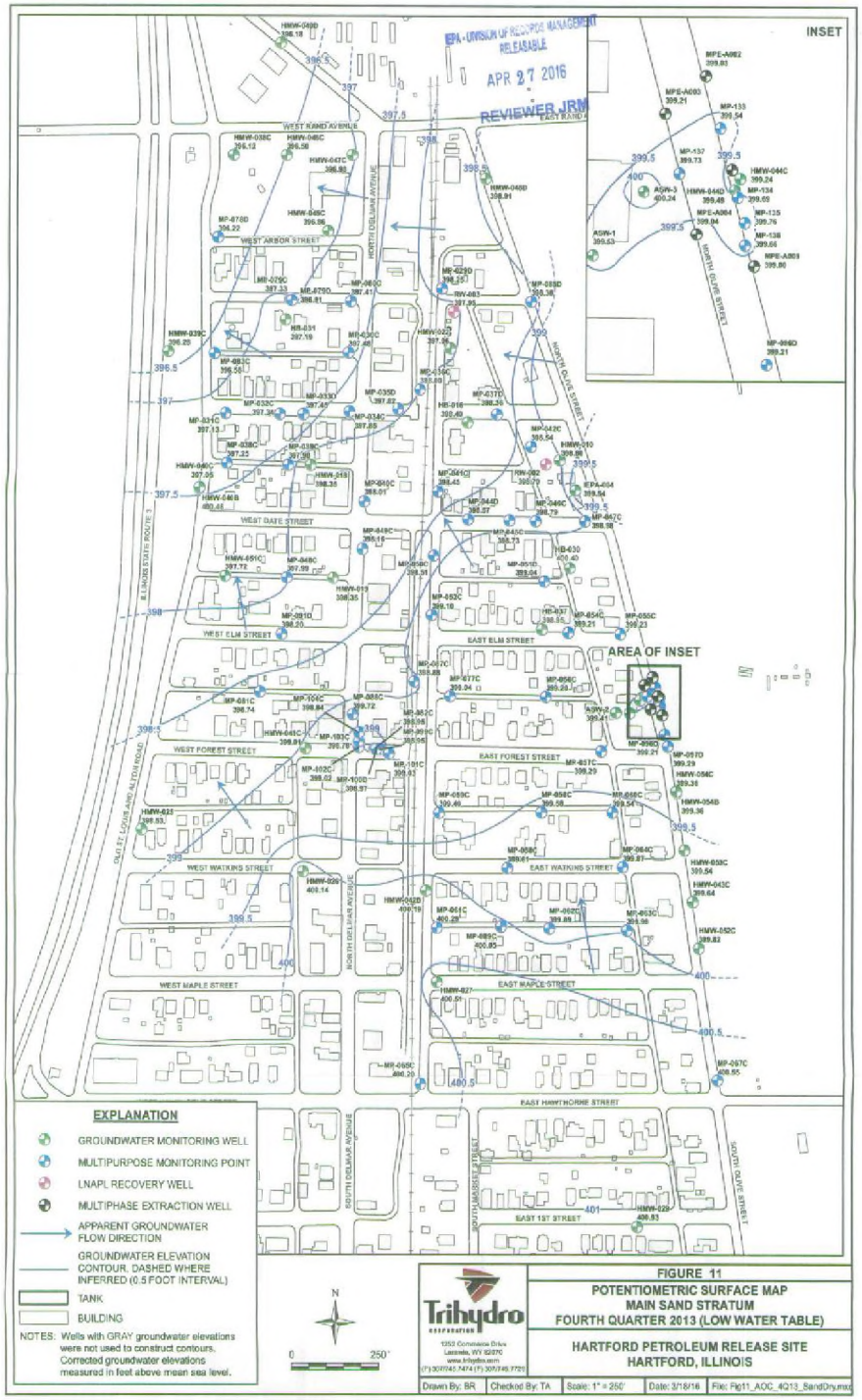

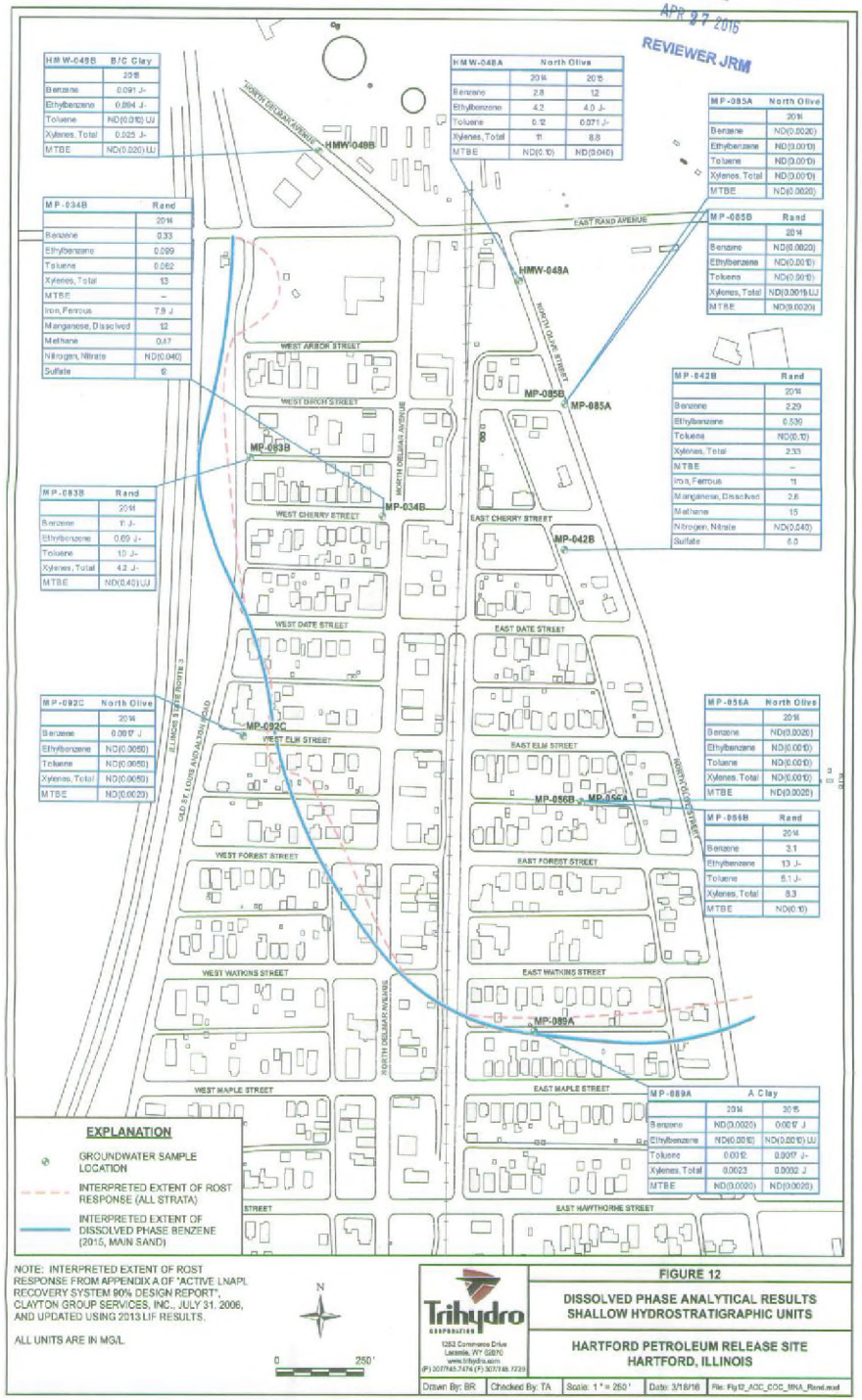

NOTE: INTERPRETED EXTENT OF ROST RESPONSE FROM APPENDIX A OF "ACTIVE LNAPL RECOVERY SYSTEM 90% DESIGN REPORT", CLAYTON GROUP SERVICES, INC., JULY 31, 2006, AND UPDATED USING 2013 LIF RESULTS.

ALL UNITS ARE IN MG/L.

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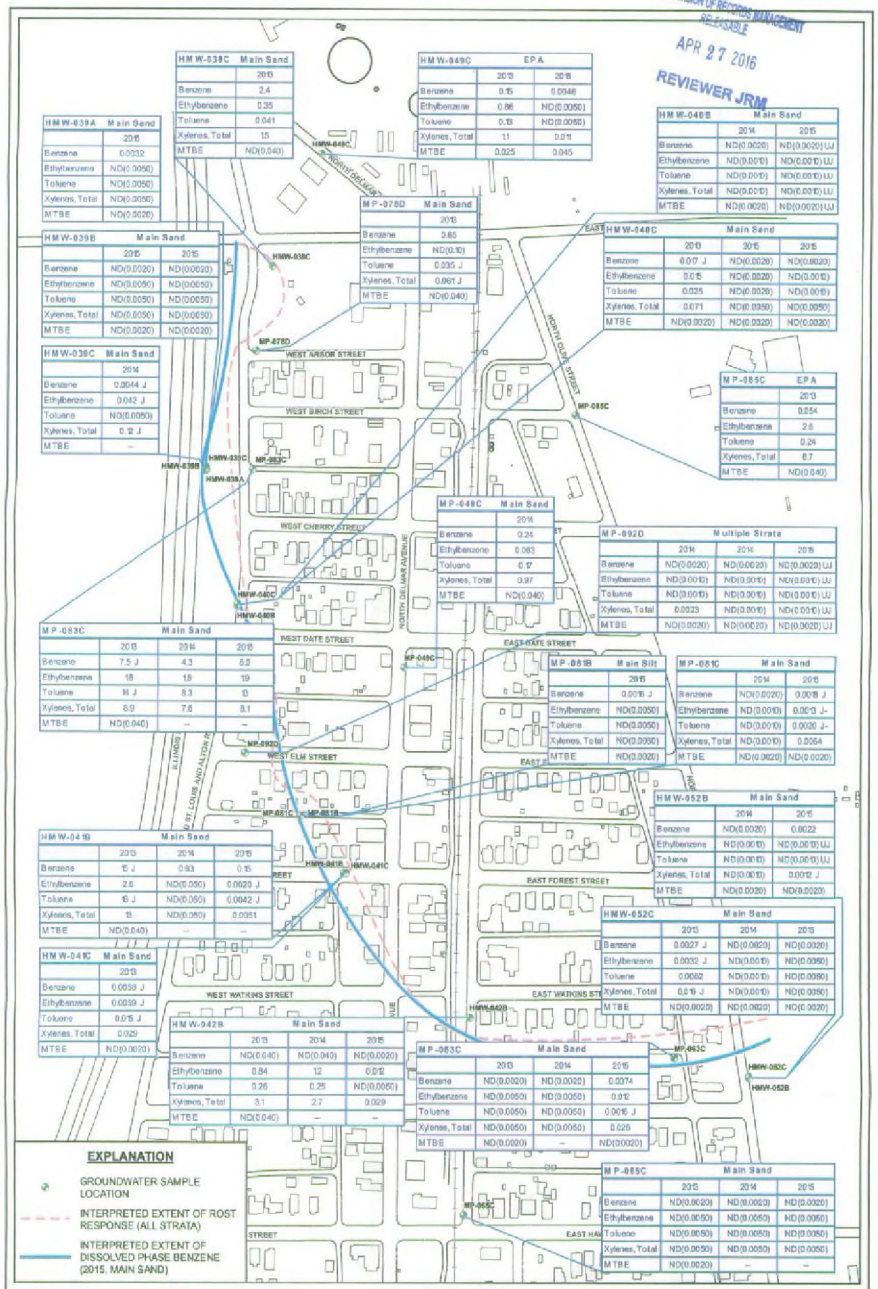
FIGURE 12

DISSOLVED PHASE ANALYTICAL RESULTS SHALLOW HYDROSTRATIGRAPHIC UNITS

HARTFORD PETROLEUM RELEASE SITE HARTFORD, ILLINOIS

Drawn By: BR | Checked By: TA | Scale: 1 " = 250 ' | Date: 3/18/16 | File: Fig12_AOC_COC_MNA_Rend.mxd



NOTE: INTERPRETED EXTENT OF ROST RESPONSE FROM APPENDIX A OF "ACTIVE LNAPL RECOVERY SYSTEM 90% DESIGN REPORT", CLAYTON GROUP SERVICES, INC., JULY 31, 2006, AND UPDATED USING 2013 LIF RESULTS.

ALL UNITS ARE IN MG/L.

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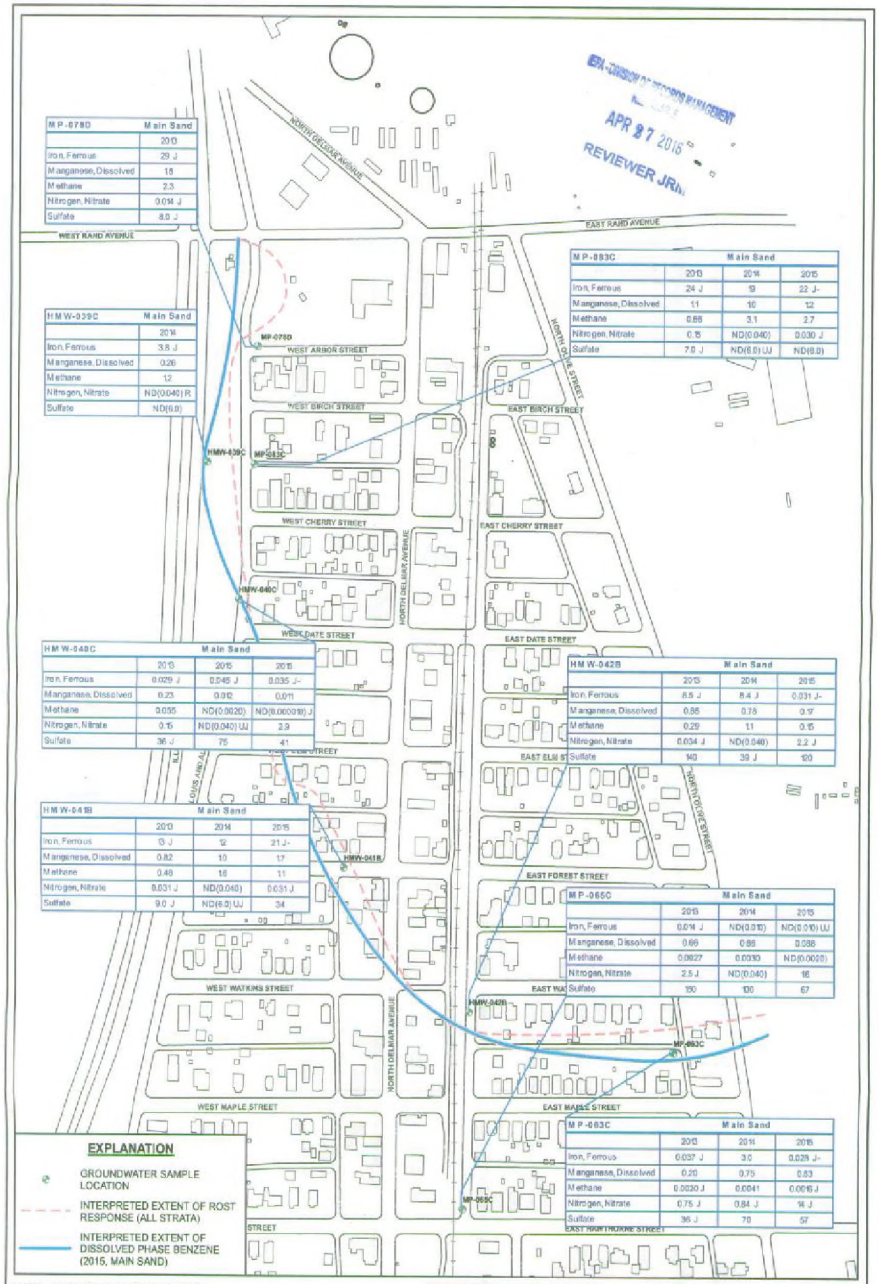
FIGURE 13

DISSOLVED PHASE CONSTITUENTS OF CONCERN DEEP HYDROSTRATIGRAPHIC UNITS

HARTFORD PETROLEUM RELEASE SITE HARTFORD, ILLINOIS

Drawn By: BR | Checked By: TA | Scale: 1 " = 250 ' | Date: 3/18/16 | File: Fig13_AOC_COC_Sand.mxd



MP-079D	Main Sand
	2015
Iron, Ferrous	29 J
Manganese, Dissolved	18
Methane	2.3
Nitrogen, Nitrate	0.014 J
Sulfate	8.8 J

HMW-039C	Main Sand
	2014
Iron, Ferrous	3.8 J
Manganese, Dissolved	0.26
Methane	12
Nitrogen, Nitrate	ND(0.040) R
Sulfate	ND(8.9)

MP-083C	Main Sand		
	2013	2014	2015
Iron, Ferrous	24 J	19	22 J-
Manganese, Dissolved	11	10	12
Methane	0.68	3.1	2.7
Nitrogen, Nitrate	0.15	ND(0.040)	0.030 J
Sulfate	7.6 J	ND(8.9) UJ	ND(8.9)

HMW-040C	Main Sand		
	2013	2015	2015
Iron, Ferrous	0.029 J	0.046 J	0.035 J-
Manganese, Dissolved	6.23	0.912	0.011
Methane	0.035	ND(0.0020)	ND(0.000018) J
Nitrogen, Nitrate	0.15	ND(0.040) UJ	2.9
Sulfate	36 J	75	41

HMW-042B	Main Sand		
	2013	2014	2015
Iron, Ferrous	8.5 J	8.4 J	0.031 J-
Manganese, Dissolved	0.55	0.18	0.17
Methane	0.29	1.1	0.15
Nitrogen, Nitrate	0.034 J	ND(0.040)	2.2 J
Sulfate	140	39 J	120

HMW-041B	Main Sand		
	2013	2014	2015
Iron, Ferrous	13 J	12	31 J-
Manganese, Dissolved	0.82	10	17
Methane	0.48	18	11
Nitrogen, Nitrate	0.031 J	ND(0.040)	0.031 J
Sulfate	9.0 J	ND(8.9) UJ	34

MP-065C	Main Sand		
	2013	2014	2015
Iron, Ferrous	0.016 J	ND(0.010)	ND(0.010) UJ
Manganese, Dissolved	0.69	0.86	0.088
Methane	0.0027	0.0310	ND(0.0020)
Nitrogen, Nitrate	2.5 J	ND(0.040)	16
Sulfate	150	130	67

MP-063C	Main Sand		
	2013	2014	2015
Iron, Ferrous	0.037 J	3.0	0.029 J-
Manganese, Dissolved	0.20	0.75	0.83
Methane	0.0030 J	0.0041	0.0016 J
Nitrogen, Nitrate	0.75 J	0.84 J	16 J
Sulfate	36 J	70	57

BOL REFERENCE SHEET --- SAME FACILITY

Facility Number: 1190505040
Facility Name: Hartford Free Hydrocarbon Plume
USEPA Number:
File Category: Compliance

FOR ADDITIONAL INFORMATION ON THIS, SEE CATEGORY 08 /CD UNDER THIS SAME FILE HEADING.

DATE OF OTHER DOCUMENT	DESCRIPTION OF OTHER DOCUMENT
April 8, 2016	Dissolved Phase Investigation Summary Report